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The RUBBER AGE

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LATE NEWS of the Industry

Crude Rubber Drops to New Low Price Level

April Contracts Are Sold at 6.40 Cents a Pound As Restriction Plans Are Rejected by Producers

WITH the withdrawal from international negotiations of important groups of Dutch rubber producing interests, the price quotations for crude rubber slumped to levels three-quarters of a cent below any previous mark recorded in the history of the industry. The commodity, which had been quoted as high as 8⅜ cents a pound early in March, collapsed abruptly and after the Easter holidays was quoted at 6¾ cents on April 6 and as low as 6.40 cents for the old "A" contracts on the Rubber Exchange of New York.

A Dutch committee visited London toward the end of March for the purpose of enlisting the co-operation of the British growers in some type of restriction scheme, thereby reversing the situation which prevailed nine or ten years ago when the British were vainly seeking to interest the Dutch rubber growers in the Stevenson program. Cable reports on March 25 stated that at a meeting held between some of the chief Dutch producers in connection with a new restriction scheme, it was learned that the plan had been presented to the Minister for the Colonies by one member of the committee without the general approval of the rest of the committee. It was also disclosed that the Dutch government would not be expected to give its support to any restrictive measure, now that dissension has split the ranks of the rubber growers' committee which conducted the negotiations.

Later reports asserted that at the Dutch Rubber Committee meeting only internal matters concerning the committee were dealt with and the question of restriction was not discussed. The only act of dissension, it was claimed, was in the five large rubber producers who are opposed to restriction wiring to the Minister for the Colonies that they were not willing to co-operate in a restriction scheme.

Nevertheless, the market accepted the disagreement as positive evidence of failure of a new restriction program, and the course of quotations for the commodity has reflected that sentiment. If the large Dutch interests now persist in their policy of "laissez faire" for the industry, it was stated by authorities in the trade, it means that rubber will continue to remain below production costs until such time as the ruined producers abandon their estates. This will eventually create a shortage, and only the well managed and amply financed producers will survive the ordeal, it was asserted.

The collapse of crude rubber prices from 8⅜ cents a pound early in March to 6¾ cents as of April 6 means that the world's stocks of about 500,000 tons of the commodity have shrunk nearly $20,000,000 in value. On the Rubber Exchange, prices held steady in a quiet market after the Easter holiday, but at the close of trading broke 20 points to set the new low record of 6.40 cents a pound. That level was established on the old April delivery along with a sale of the same delivery at 6.50 cents, both being transacted by a small dealer at a moment when there was very little buying interest in the ring.

The low record of 6.40 cents was established on the old "A" contract of 2½ tons of rubber. On the new No. 1 Standard contract of 10 tons of certificated rubber, the lowest figure set was on a sale of the May delivery at 6.76 cents on April 1.

Up until the third week of March it had been considered possible that some form of restriction might be agreed upon by British, Dutch and other European producing interests. The scheme enjoying most favorable consideration had been the so-called Maxwell Plan, devised by Sir George Maxwell, who had shared in the drafting of the Stevenson Act in 1922. This was based on a pivotal price of 9d for rubber with a 25 per cent restriction of exports and a 10 per cent duty on native Dutch East Indies rubber.

An expression of willingness to co-operate had previously been obtained indirectly from Lord Passfield, British Colonial Secretary, during a session of the House of Commons. Upon being questioned by a member of the house, the Under Secretary of State, Dr. Drummond Shiels, declared, "My noble friend is well aware of the extremely

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depressed state of the rubber industry and of the deplorable effects on those engaged in the industry, and he has consulted the High Commissioner for the Malay States on the subject; but he regrets that the government can not see its way to initiate any scheme. If, however, the producers in all the countries concerned can agree on a scheme which provides for a practicable planning of aggregate production in correspondence with world demand, he will be prepared to give it careful consideration."

Meanwhile, Malayan exports for April are estimated at 42,000 tons, well below the high figure of 48,000 tons for March, but still far higher than the producing industry would like to see. Rubber plantation securities are selling at low levels, and the unemployment problem is becoming more serious in the Middle East, particularly among European skilled workers who have been discharged from estates. American and other rubber manufacturing companies are again facing inventory losses, though small in comparison with those of previous years. No definite knowledge as to further negotiations among producers has been obtainable, but there are still strong interests backing restrictive proposals.

McClaren Rubber Company Refinancing; To Foreclose on Ajax Rubber Property

REFINANCING of the McClaren Rubber Company, a subsidiary of the Ajax Rubber Company, is planned, according to a letter sent to stockholders of Ajax by its president, H. L. McClaren. Holders of the $500,000 8 per cent gold notes of Ajax Rubber, the letter states, have purchased all the outstanding capital stock of McClaren Rubber and have arranged for the underwriting of 3,750 new class A preferred shares of McClaren, of $100 par value, with a bonus of 10 shares of no-par common for each share of preferred. This underwriting will provide $375,000 of new capital for the company.

By arrangement with the underwriters, the right to acquire the McClaren Rubber Company stock offering has been reserved to the Ajax stock and bond holders. After the recapitalization, the stock structure of McClaren Rubber will consist of 5,000 shares of $100 par class A preferred, 1,000 shares of class B preferred, and 100,000 shares of no-par common.

Plans for placing production at the McClaren plant at Charlotte, N. C., close to capacity and adding 100 persons to the force by April 20 have been announced by I. Eisbrough, acting vice-president. This will raise the McClaren payroll to 400 men and the output to 1,000 tires daily.

Meanwhile, it is announced that the Chase National Bank, as trustee for $1,324,000 of first mortgage bonds of the Ajax Rubber Company, will soon institute foreclosure proceedings against the Ajax Rubber factories at Racine, Wis. Interest on the bonds was defaulted on December 1 last, and the company has ceased operating.

In his letter, Mr. McClaren pointed out that arranging new financing for Ajax was impossible, "due to the fact that the company is not only obligated upon the bond issue but is in default in respect to its obligations to bank creditors, and at the present time there is an unpaid balance due them of approximately $300,000.

"The company also defaulted in the payment of interest on its $500,000 of 8 per cent gold notes and is indebted to the holders thereof in said amount. It is more than likely that there will also be a deficit to bondholders after the disposal of all the mortgaged property. There will be a deficit to the company's creditor's in excess of $1,000,000."

Raybestos-Manhattan, Inc., Report Shows Deficit of $570,754 After Dividends

THE complete annual report of Raybestos-Manhattan, Inc., for the year ended December 31, 1930, shows net earnings of $1,156,770, resulting in a deficit after dividends of $570,754. This compares with net income of $3,206,293 in 1929, which left a surplus of $1,668,340 after dividend payments.

The net income for 1930 was arrived at after making all provisions for inventory adjustments and similar items amounting to $327,364, for depreciation of properties amounting to $550,334, federal income taxes of $109,736 and crediting, as no longer required, $300,000 of the reserve set up in prior years for inventory adjustments. In addition, expenditures of about $500,000 were made for maintenance and repairs, and charged to operations.

At the close of the year, the company had total assets of $17,979,325, of which $9,721,750 represented capital and $7,570,633 surplus. There were no bank loans or funded debt. The current assets of $8,312,362, including cash, municipal and other bonds and marketable securities amounting to $3,306,134, were 15.6 times the current liabilities of $533,208, and compared with the ratio of 8.7 to 1 at the beginning of 1930.

Net sales were $16,683,243 as compared to $23,047,511 in 1929. In 1928, predecessor companies had net sales of $22,194,866 and net income of $2,465,585.

"We enter the year 1931," says Sumner Simpson, president, "excellently prepared and in as strong a financial position as could be desired, with inventories written down to the lowest quotations for replacement, with an organization functioning well, and with plans for the immediate future conservatively made and based on determinable factors and conditions, indicating that the future need hold no fear for the company's officers, directors or stockholders." Stockholders in the company now number over 3,000.

The consolidated income account of Raybestos-Manhattan, Inc., for the year ended December 31, 1930, compares with the previous year as follows:

	1930	*1929
Net sales	$16,683,243	$23,047,511
Costs, expenses, etc.	15,136,109	18,822,459
Operating profit	$1,547,134	$4,225,052
Other income	269,707	332,556
Total income	$1,816,841	$4,557,608
Depreciation	550,334	591,151
Adjustment of invent to market	.....	343,536
Federal and state taxes	109,737	416,628
Net income	$1,156,770	$3,206,293
Dividends	1,727,524	†1,537,953
Deficit	$570,754	‡$1,668,340

*Includes operations of predecessor companies. †Includes $49,690 preferred stock dividends of the Raybestos Co. and U. S. Asbestos Co., $1,056,492 common dividends of Raybestos Co., Manhattan Rubber Manufacturing Co. and U. S. Asbestos Co. and $431,771 dividends paid by Raybestos-Manhattan, Inc., December 16, 1929. ‡Surplus.

To Make Falls Tires in England

Completion of negotiations for the manufacture of the Falls Roadmaster tire in England is announced in the first annual statement of the Master Tire & Rubber Corporation, controlling the Falls Rubber plant at Cuyahoga Falls and the Cooper and Giant factories at Findlay, O. The consolidated balance sheet of Master Tire shows current assets of $1,335,617, and total assets of $3,134,000.

125 Members of Rubber Division, A. C. S., Attend Spring Meeting at Indianapolis

THE spring meeting of the Rubber Division of the American Chemical Society was held at the Severin Hotel, Indianapolis, Ind., on April 1 and 2 in connection with the 81st session of the entire society. The business meetings and banquet of the Rubber Division were attended by about 125 members and guests from rubber manufacturing centres throughout the country.

There were twelve technical papers presented (*see abstracts in* THE RUBBER AGE *of March* 25), all of which covered important topics in the technology of rubber, gutta percha, balata and chicle. The sessions of the Rubber Division were held in the Rainbow Room of the Severin Hotel under the direction of H. A. Winkelmann, chairman of the division; H. E. Simmons, secretary-treasurer, and John E. Cady, local assistant.

Reporting for the Physical Testing Committee, Chairman R. P. Dinsmore stated that at the first meeting of the committee on October 23 last, it was agreed that the most suitable activity would be the collection of data on the operating conditions for various physical tests with the idea of informing the Rubber Division as to the present operating limits and, if possible, to suggest standards. A number of different tests were considered, but it was decided to deal first with bomb and oven aging and artificial light tests. Akron members held a sub-committee meeting February 9 at which they outlined a tentative questionnaire for submission to the entire committee for revision and approval. It was announced that the laboratories of the industry will shortly be circularized with these revised questionnaires.

H. L. Trumbull, chairman, read a recommendation of the Papers Committee to the effect that the practice now being observed in the preparation and presentation of papers be continued. The members of the Rubber Division voted unanimous approval of this recommendation.

The banquet of the division was held Wednesday evening, April 1, under the direction of S. L. Weller, J. E. Cady and E. R. Waite. A five-piece women's orchestra furnished entertainment throughout the evening, together with several dancers and a dancing waiter act. Members and guests, on entering the banquet hall, were presented with bibs of colored rubber having the menu printed on them. Each diner received as souvenirs at his place a combination knife, bottle opener and corkscrew furnished by the United Carbon Company, a green rubber coaster furnished by the United States Rubber Company, and other rubber novelties.

Members of the American Chemical Society on April 3 visited the factory of the G. & J. Tire Company, the plant of the Prest-O-Lite Storage Battery Corporation, and other local industrial establishments. Among papers presented at other divisions of interest to rubber men were a discussion of "The Influence of the Physical Properties of Carbon Black on Its Tinting Strength," by E. P. W. Kearsley and G. L. Roberts, of the United Carbon Company, before the Paint and Varnish Division and an analysis of "The Flame-Pressure Process for Carbon Black" by A. W. Francis before the Petroleum Division.

A feature of interest occurred in the general program of the society during a discussion of "Atomic Structure" by Professor Harold C. Urey during a symposium on "Mathematics in the Service of Chemistry." Professor Urey employed a rubber sheet in a wooden frame as a "blackboard" of the new higher mathematics and inserted a pencil upright under the rubber to raise it like a tent in demonstrating the hydrogen ion.

Goodyear Tire & Rubber Company Cuts Common Dividend Rate to $3 Annually

DIRECTORS of the Goodyear Tire & Rubber Company on March 30 reduced the annual dividend rate on the common stock from a $5 to a $3 basis by declaring a quarterly payment of 75 cents a share. Dividends on the common stock were resumed after a nine-year lapse on August 1, 1929, at $1.25 quarterly, at which rate they had since been maintained.

Factors which prompted the cut in the dividend rate were believed to be the current unsettlement in the rubber industry, particularly the keen competition in the tire industry and the recent weakness in the price of crude rubber, and the fact that earnings on the common stock were only $3.16 a share in 1930. The action of the directors was not unexpected in financial circles, and, therefore, caused no serious weakness in the quotations for the stock.

The directors' session followed immediately after the annual meeting of the stockholders of the company, at which all members of the directorate were re-elected. The directors subsequently re-elected P. W. Litchfield as president and chairman of the board, together with all the other officers of the company.

In an interview at Boston a few days before the company meetings, Mr. Litchfield stated that he regretted he was unable to report any noteworthy improvement in the tire industry. Goodyear, he said, is producing 53,000 tires a day at Akron, 6,500 at Gadsden and 8,000 at Los Angeles, a total of 67,500. This figure compares with about 73,000 a day a year ago and is some 35 to 40 per cent better than the fourth quarter of 1930. The outlook for the tire industry in 1931, in Mr. Litchfield's opinion, is for a total production about the same as in 1930.

Automotive Rubber Exports Declined Slightly During Month of February

EXPORTS of automobile tires, inner tubes, tire sundries and repair materials from the United States during the month of February had a total value of $2,168,070, representing a slight decline from the January total of $2,268,967. The chief market for passenger car casings and inner tubes was Sweden. The effect of the start of tire manufacturing in Argentina is already apparent with that country, for years the leading export market, dropping to thirteenth place. In the month 136,421 passenger car casings were exported with a value of $1,063,998 and 38,594 truck casings, worth $789,895, British India being the chief customer for the latter.

Rubber boots exported during the month numbered 25,831 pairs with a value of $70,600, and rubber shoe shipments totaled 93,718 pairs with a value of $61,114. The United Kingdom was the chief market for the former and Chile for the latter. Export of canvas rubber-soled shoes increased to 215,075 pairs with a value of $139,553. The Philippine Islands was the best customer for this type of footwear, with Cuba in second place.

Shipments of rubber belting in February amounted to 267,483 pounds, worth $124,056, and exports of rubber hose totaled 471,130 pounds with a value of $136,497. The United Kingdom was the leading customer for rubber belting and was second to France as a buyer for rubber hose.

During February, the United States exported 1,401,176 pounds of reclaimed rubber, valued at $69,419, or 4.95 cents a pound, and 3,886,117 pounds of scrap and old rubber, worth $106,830. Canada was, as usual, our best customer for reclaim, while Spain led all other markets for rubber scrap.

(Other news of the industry will be found on Pages 33-39)

Courtesy Moving Picture Review

Amos 'n' Andy Talking Things Over in Radio's "Check and Double Check"

AMOS 'N ANDY Buy a Rubber Factory

And Incidentally Discuss the Present Trials and Tribulations of the Industry

By **F. A. SEIBERLING**

President, Seiberling Rubber Company

(With due apologies to the two famous radio entertainers)

ARRIVING at the office of the taxicab company, Amos is amazed to learn that Andy has sold the assets of the Taxicab Corpulation. Amos demands to know how much money was realized in the sale, and asks for his share. Andy replies with lofty disdain:

"Dere you is again, Amos. You don't know nothin' about bizness. Nothin' sells for money no mo'. Everything sells for 'stallments. I is done paid down de taxicab bizness as de fust 'stallment on a rubber factory."

"Rubber factory? Whut we goin' do wid a rubber factory? We don't know nothin' about runnin' no rubber factory, does we?"

"Corse we don't, Amos. De man I traded with done 'splained dat. He said we didn't have to know nothin' about a rubber factory to git de bizness. He tole me dat if all de folks in de rubber factory bizness knew anything at all 'bout nothin', dey wouldn't be in the bizness. He said we wasn't taxicab drivers no mo'—we is factory magnets."

"We is, huh? Now ain't dat sompin?' Well, if we is magnets, whut's de next thing we is gonna do?"

"Well, now we is gonna meet wid all de buyers. De mo' buyers you meet, de mo' goods you can sell below cost. De man done 'splained dat de further you sell under cost, de better de factory man what you is."

"Below cost, Andy. Whut you mean? 'Splain dat cost to me. What is it?"

"Don't nobody know what dat cost bizness is, Amos. Dat's what de man done said. Cost is sumpin' de factory men guesses at and sells under. De man what guesses de lowest and sells de most under, gits de prize."

"Whut's de prize, Andy?"

"Well, as I understands it, de factory man what sells de lowest fur de longist time, gits a chance to liquidate. Dat's whut de man said."

"Dat liquidatin' stuff sho sounds good—but, Andy, you ain't tole me as yet what we is goin' to do wid dat rubber factory."

"Well, Amos, as I sees de sichyashun, it's like dis. Dere is two things you can do wid a rubber factory. Fust, you can run it. Secunt, you can curtail wid it."

"Curtail, Andy? Whut you mean by dat?"

"Dat's easy, Amos. Fust, you runs de factory and makes all de stuff you can. Den when de buyers is done bought all dey can pay for, as fur under cost as you can guess to, dey resigns away from the market. Den, we begins to curtail. It don't mean nothin', 'cept we knocks off from work. We stops de factory, does a little fishin', plays a little golf and maybe goes on a convenshun."

"Uh, huh. Now 'bout dis curtailin' bizness, Andy. I like de sound of dat. How long do it last, and how long does we rest like dat?"

"Well, Amos, we curtails till de buyer gets hard up for mo' goods. De factory man has to watch de buyers mighty close and juss fo' it looks like de buyer is goin' to have to pay mo' den dat cost thing, de factory man rushes to make all de goods dey can and ketches up even wid de buyer again. Den befo' any of 'em is ready to start in again dey is right where dey wuz when dey started. If you wuz a bizness man you would understan' dat can't nobody beat a system like dat. De man whut sold us de factory said dat system was de big thing in de rubber factory bizness. You can see he's right 'bout dat."

"But listen, Andy—sposen de factory man gits kinder keerless and does dis curtailin' too long, an' de goods gets to sellin' over de cost. What den?"

"Nobody knows what would happen den. It's been so long since it wuz like dat, everybody done forget whut did happen. But ain't nothin' for us to worry 'bout, Amos."

"I guess you is right, Andy."

"Check and double check."

Silvertown Safety League

AN APPEAL to every motorist in the United States to cooperate in a national campaign to lessen traffic accidents and improve safer driving conditions has been launched by the B. F. Goodrich Rubber Company.

In an effort to curb the rapidly mounting toll of accidents and deaths resulting from mishaps in which motor vehicles figure, the Goodrich Company is sponsoring through its distributors and dealers, the Silvertown Safety League, soliciting every car driver to pledge himself to more careful car operation.

The Safety League campaign is being conducted through newspapers, leading magazines and over a national radio network of stations, and pledges are available in every locality in the country, together with car emblems and small lapel buttons for those who are signers.

TRENDS *in the Latest Applications of* RUBBER

New Developments in the Technology of Manufacture of Rubber Products Promise Great Possibilities for the Industry—The Increasing Use of Liquid Latex May Revolutionize Many Present Manufacturing Practices

THE rubber manufacturing industry has had one of the most remarkable histories, for comparatively so short a life, in all the realm of industrial romance. Some new application of crude or reclaimed rubber presents itself daily and there seems to be no limit in sight to its use. The impossible of yesterday is the latest practical development of today. Five years ago the idea of an acid resistant rubber lining on the inside of a tank car was an impractical and commercially uneconomical dream. Today such cars are in frequent use.

New developments, not only in the construction and design of rubber articles, but in the technology of curing and handling the crude product, have opened up vast opportunities for new applications of rubber in numerous manufacturing fields. Thus, the present practicality of transporting liquid latex from the Far East direct to American industrial plants has made possible many new departures in manufacturing methods. The technology of dispersions of rubber, the compounding and vulcanization of liquid latex, the perfecting of the method of plating with rubber by electrolysis and the ability to re-odorize rubber have all contributed to expanding the use of rubber to many new fields.

There is no definite trend in the new uses of rubber other than to say that it is far becoming almost universal in its applications. The trend of these applications will continue to follow the developments in scientific and industrial progress.

Automotive Industry

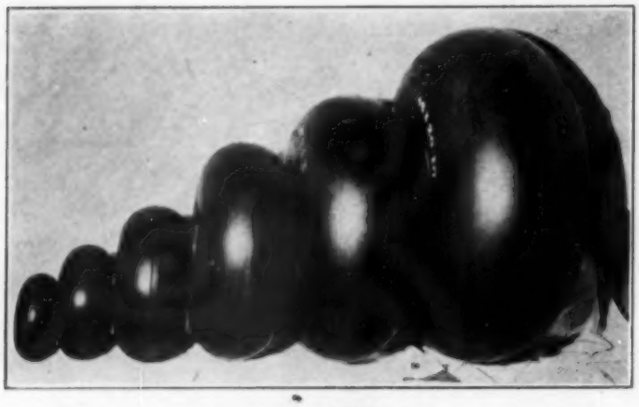
Probably the most astounding advance in the new applications of rubber has come in the automobile, entirely aside from tires and inner tubes. In a recent address before the Society of Automotive Engineers, R. K. Lee, of the Chrysler Corporation stated that his company used over 450 different rubber parts covered by 50 different rubber specifications; that in the Chrysler 8-sedan there were 270 different rubber parts, with a total weight (including tires) of 141 pounds, or 3.8 per cent of the total weight of the car. The mechanical rubber parts, however, totaled 38 pounds and approximately 8 per cent of the total cost of the car is in rubber. A year ago, in a paper delivered before the American Society for Testing Materials, Walter C. Keys, then chief engineer of the automotive development department of the United States Rubber Company, detailed 65 different specific rubber parts, used in automobile construction, as follows:

Tires and tubes
Axle bumpers
Spring shackles
Body sill anti-squeak
Vibration dampeners
Hydraulic brake parts (pistons, boots and pressure hose)
Universal joint parts
Hood ledge covering
Door bumpers
Windshield channel
Windshield wiper
Spark plug thimbles
Grommets for wires and tubing
Engine mountings
Gear shift ball
Kick plates on dust shield
Running board covering
Floor and toe board covering
Hood corner protectors
Hood latch bumpers
Tubing
Insulated wire
Steering wheel
Fan belt
Head lamp wire (covered with rubber which will not tarnish silver)
Car bumpers (front and rear)
Car bumpers of steel with rubber insulating pads
Pedal pads
Accelerator button
Horn button
Distributor head
Water hose
Distributor thimbles
Battery jars and case
Door handles
Radiator cap
Radiator shims
Shock absorber link cushions
Window channel
Toplight frame
Sealing washers around pedal slots, etc.
Step pads
Magneto coupling
Windshield post pad
Floor boards with vulcanized rubber coverings
Running boards with vulcanized rubber coverings
Shaft couplings
Rubber molding
Truck cab mountings
Passenger car body mountings
Brake lining containing rubber
Windlace tubing around doors
Fabric and carpet containing rubber
Clutch hub—rubberized fabric
Door checks
Door dovetails
Steering column bushing
Tire valve cap and core seals
Hard rubber connectors of electric wiring
Rubberized fabric roof covering
Wind seal (rear windows and bottom of doors)
Bumpers on open car top support irons
Hood center bumper
Gaskets
Sponge rubber arm rests

Compositions of rubber, such as the new Automotive Super-Lexide, of the United States Rubber Company, are now entering into automobile upholstery foundation boards, door panels, cowl panels, anti-squeak body shims or spacers, hood lace, radiator and gasoline caps, gaskets, etc. Hard rubber molded goods are playing an increasingly important part in the matter of ornamental accessories and fixtures in automobiles.

Aviation

The field of aviation promises to be as full of potentialities for the rubber industry as the automobile industry was two decades ago. It is already opening an opportunity of vast possibilities for rubber consumption. Naturally the tire requirements for aircraft offer the principal field. These are being built on radically different lines than the ordinary automobile pneumatic casing, with more rubber content and greater balloon features. Treads are of minor importance in airplane tires but strength and resistance to abrasion are vital, as the airplane tire speeds up from zero to over several hundred r. p. m. on each take-off and landing. They are being constructed today in sizes ranging from 18 x 3 to 44 x 10 for both main wheels and tail gear.



Airplane Tires

The valuable property of rubber to aircraft is its shock absorbing qualities. Rubber shock absorbers and tension and compression rings are being used in every place possible in airplane construction, as well as rubber mountings for the engine and fuel tanks. Cabins are usually rubber insulated and rubber flooring is also used. Rubberized fabrics and sheet rubber are being used for covering open cockpits and for waterproofing. Ebonite or hard rubber is employed for electrical insulations and for instrument boards. Lately a device, composed of a thin sheet of rubber has been introduced over the edge of the wings, which when slightly inflated by pump arrangement from the cockpit, serves to remove any incrustations of ice forming on the plane.

In the matter of lighter-than-air craft the mechanical applications of rubber are very similar in general to those in airplanes, but a number of new uses are also employed. Rubberized balloon fabric is still the most important factor in lighter-than-air craft construction.

More and more applications for rubber can unquestionably be expected as the development in aircraft proceeds.

Footwear and Clothing

The field in which rubber was first prominently used has been the one to show least any radical changes in the trend of manufacturing practice. Except for modifications in design, rubber footwear has not been marked in recent years by innovations. The galosh has become firmly intrenched, and overshoes of this type for women are today designed by expert stylists and feature comments by Parisian *coutouricres* in their advertising appeal. But the general lines of rubber shoes and tennis footwear remain practically unchanged.

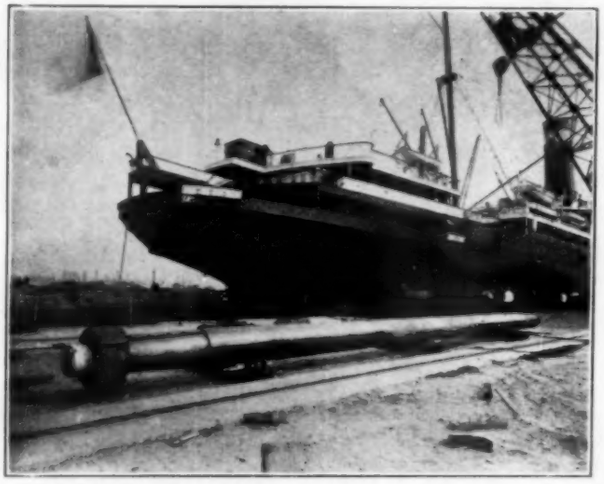
The use of rubber heels is rapidly becoming universal, while the rubber sole for leather sport shoes and even business wear shoes is coming into a greater vogue. Crepe and gristle soling materials are being popularized, as are a variety of rubber-composition materials, such as the Darex insulating sole of the Dewey & Almy Chemical Company.

Design has been the only phase of rubber clothing to show innovation. Waterproof clothing is now furnished in modernistic patterns and in a complete range of colors. Cape effects and fur trimmings have become popular abroad and are being introduced in this country. Bathing millinery shows more radical changes, the plain rubber caps of previous years being succeeded by more ornate models with bright colors and various types of ornamentation. The latest novelty in this field has been the introduction of sponge rubber caps in beret and Cossack designs by the Faultless Rubber Company.

Mechanical and Engineering Uses

Rubber insulation in electrical installations has always been a prime use of rubber in the construction field and is still increasing in its applications. New developments along this line have been made in flexible contact wire by the Bishop Wire and Cable Company, by which pressure on any part of the line will close the circuit The Bell Laboratories have also contributed to new developments in wire insulations with the introduction of Paragutta, a new rubber and gutta percha compound for submarine cable insulation. Soft rubber plugs are also a recent innovation.

Rubber linings for piping, tanks, wooden chemical containers, chutes, tank cars and other equipment constructed for acid-resisting or anti-corrosive purposes, fall also into this class. Great progress has been made in this regard, notably through the developments of the Goodrich Company with their Vulcalock process of rubber linings for all



Propeller Shaft of the *S.S. Leviathan* Ready for Installation in Rubber Lined Sleeve

classes of industrial equipment, on both metal and wood, and the Wilkinson Process Rubber Company's product—Linatex. The United States Rubber Company has also been particularly active in this field. Rubber sleeves for propeller shaftings and cutless bearings are comparatively new developments in steamship and water-craft construction.

Rubber gaskets, washers, flexible joints, packings and mountings for many types of machinery are on the increase and represent a constantly increasing field for new applications of rubber.

Flooring and Wall Materials

Few recent developments in the use of rubber show the steady progress which rubber flooring has enjoyed. Here is a field which can be said to be almost unlimited and one which is opening up for the application of rubber in yearly increasing proportions. The trend in rubber flooring is also following the prevailing trend in art, in its designs and color schemes. The utility of rubber flooring has already been demonstrated. Costs of installation and maintenance have decreased and the previously experienced difficulties in laying the flooring and securing an effective bonding agent to the sub-flooring, have now been overcome. Far-reaching possibilities await the application of rubber in this field. It is finding popularity not only for business and professional offices, clubs, libraries, hospitals, hotels, etc., but also on steamships, railway cars and airplanes.

While the prevailing type seems to lean to the tile con-

struction, strips and large sheets are coming more and more into use and are more economical to install. A fibre reinforced tile is a late development of the Stedman Rubber Flooring Company. In this reinforced tile, new cotton fibres, short filaments almost invisible to the eye, are introduced into the rubber compound, forming a reinforced mass which later under vulcanizing pressure becomes a homogeneous whole.

A sponge rubber flooring ("Airtred") is also a new development of the St. Albans Rubber Company, Ltd., of England. The material has a sponge rubber base cemented to a topping of sheet rubber, thereby giving the effect to the feet of walking on a soft carpet.

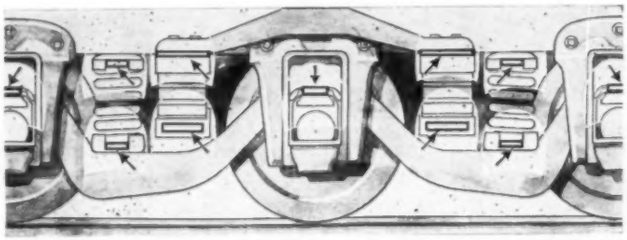
Recently there has been agitation to carry this development to not only floors but to walls, wainscotting and stair balustrades as well. The United States Rubber Company has been particularly active in this regard and has developed what is aptly termed as "Architectural Rubber" ("Royalite") for wall coverings. It comes in sheets and strips and is made in a variety of colors to harmonize with the floorings.

Another development in flooring, closely associated with rubber applications, is the new carpet manufactured by the Lea Fabrics, Inc., in which unspun fibres are impregnated with rubber and vulcanized to a fabric backing.

Paving

The advance in the adoption of rubber paving has been slow but steady, due primarily to the heavy initial costs. With rubber at present low levels there should be an increased application of rubber for this purpose. Recent reductions in costs in England have brought rubber paving down from $40 to $12.50 per square yard. All of the installations in existence today prove the practicality and utility of rubber as a paving material and reports state that no serious wear and tear from heavy and constant traffic has been evidenced.

Five types of rubber paving materials are now being tested with success in London and quite recently a stretch of 275 square yards was laid down along Victoria Street, Bristol. The experiment on Buchanan Street, Glasgow, has also proved successful.



Standard Six-Wheel Truck of B. & O. R. R. Showing Position of the Rubber Pads

Energetic efforts on the part of the Council of the Rubber Growers Association, of London, have been responsible for a great deal of the new developments in rubber roadways. Plantation companies are now contributing raw rubber for further experiments, to Rubber Roadways, Ltd., a company set up by the Rubber Growers Association, over 2,000 tons having been allocated up to March of the present year.

The United States has been slow to apply rubber to roadways and only a few short stretches exist. The last laying was of 400 square yards on the approach to the Passaic River bridge, at Passaic, N. J. But at least one large American rubber company is taking an active interest in furthering rubber paving developments and it is even hoped that the time is not far distant, when with the use of compounded liquid latex, a rubber road surface can be laid down in much the same manner as asphalt is today.

Besides the use of rubber for roadways, traffic posts and markers made of rubber, embedded in stone or macadam roads, for the control of traffic, are also coming into more frequent use.

Railways

An outstanding experiment in the application of rubber to railways has been the installation of rubber pads between the sleepers or ties and the rails, on a mile section of the government railways of the Federated Malay States.

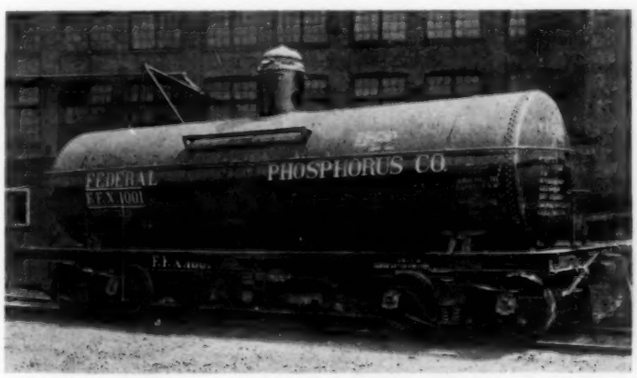
"Rubber heeling" of railway cars to absorb bumps and shocks has been adopted by both the Baltimore and Ohio and the Canadian Pacific Railroads. On the Pullman cars of the B. & O., the running gear or trucks of the cars have been "rubberized" by inserting more than 100 pieces of pure rubber at various junction points of metal in the construction of the trucks. The Canadian Pacific use a composition steel and rubber pad. The pad, a product decided upon after a series of exhaustive experiments with compressed cork, hair-felt and other compositions, is constructed with air spaces between the rubber parts in such a way that the pad not only becomes high resilient under pressure, but also tends to prevent any rebound, owing to a vacuum being set up in the air spaces.

Goodyear Tire and Rubber Company recently perfected a rubber cushioned wheel for freight and passenger railway cars, constructed much like the ordinary car wheel, except that a cushion of uncured rubber is built between the hub and rim. After this operation the wheel with the rubber is put into the vulcanizer and cured much as a solid rubber truck tire is vulcanized firmly to the metal rim.

In the subways of New York City the turnstiles are being silenced by the use of rubber rollers and pads to replace metal parts.

Medicine and Surgery

In the field of medicine and surgery there has been a steady increase in the applications of rubber, many of them being of novel interest. For instance, in collaboration with Dr. John E. McKentry, of New York City, the Western Electric has developed a rubber artificial larynx. Life sized rubber models of the human body, designed for instruction purposes in medical schools, and containing muscles and organs constructed of rubber, are the latest developments of Loyal Clark, of the Huntington Rubber Mills, Portland, Oregon. These "experimental cadavers" have many possibilities in medical instruction. M. Delbet, a French physician, in a recent issue of *Revue de Chirurgie,* writes of



Rubber-Lined Tank Cars

using rubber as a mechanical agent in surgery, in actually replacing diseased tendons and bones.

Other applications of rubber in the field of medicine and surgery include crepe rubber bandages for use as supports for weak limbs; rubberized fabric in the recently developed pneumonia tents; orthopedic heels to replace arch supports; rubber belts as supports in Gastroptosis and Enteroptosia; sponge rubber pads for support in hernias; the Ziegler clamp for the umbilical cord; and rubber air tourniquets for control of hemorrhages in joint surgery.

Toys and Sporting Goods

A wide variety of new toys, made wholly or in part of rubber, have been introduced on the market within the last few years. Beach and surf balls, floats and water playthings of every size and description have caught the fancy of the vacationists. Water sport novelties have taken on the form of anything from ordinary water-wings to grotesque sea serpents. Play balls are featured in the sports at practically every beach or watering resort today. Beach "airubber" mattresses and surf "airubber" floats and boats have been popularized and the trend is toward far greater expansion in this line of rubber goods.

Water Camel

Air rubber goods are also coming into favor as part of the equipment for hunting and camping and there has been a large increase in the manufacture and use of these articles. The use of rubber gun-butt pads is on the increase and rubber fishing flies are finding more popular favor with the anglers.

Pneumatic balloon tires are the last word on toy vehicles. They are being made as large as 12.75 x 2.50 in size, to take 25 pounds pressure for the larger types of toy automobiles and airplanes. Solid tires are a thing of the past in the newest models of childrens' vehicles and even perambulators and baby chairs are being equipped with pneumatic rubber tires.

Novelties and Specialties

In the field of novelties the applications of rubber have become almost legion. To enumerate the various specialties now being produced of rubber would fill many columns. Everything imaginable and often the seemingly impossible has been developed in rubber from jewelry to ice cube trays for refrigerators. Rubber vases and flower bowls have been introduced in a number of attractive colors and designs. Silvered ebonite toilet articles are gracing milady's boudoir table. The housewife is finding more and more rubber kitchen accessories on the market. She now buys brushes of rubber in various sizes for scrubbing; a rubber plate scraper helps clean the dirty dishes and a jar mop of rubber assists in rinsing bottles.

Pneumatic Tired Baby Carriage

In the household and office, rubber upholstery is winning some popularity. In England the trend in this regard is especially directed toward the automobile upholstery field. In store furniture and fixture fields there is an increased use of rubber topped tables and counters.

Sometimes the new applications of rubber almost border on the ludicrous, as for instance, the use of rubber life sized babies in teaching domestic science students and young mothers, and rubber cows in teaching proper milking practices in the rural districts of Canada.

Rubber has invaded the churches and worshippers may now kneel on rubber prayer mats.

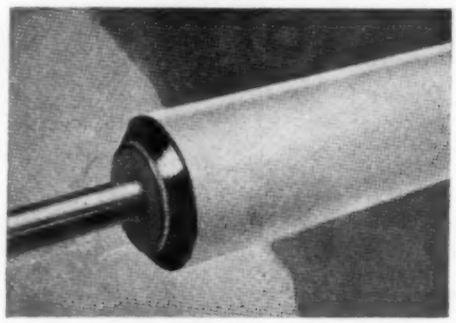
Besides the many uses to which rubber has been put in the actual filming of motion pictures, a London theatre has made the experiment of installing a perforated rubber screen. It is claimed that projection is more clearly achieved with the rubber screen and that the reproduction of sound effects is improved. Moreover the rubber screen greatly lessens the fire hazards.

Rubber type offers certain advantages in printing over the old metal variety and there has been several new developments in printing practice involving the more general use of rubber rolls and offset plates.

Since the completion and dedication of the Dunlop memorial tablet at Belfast, recently, there has been some agitation to use ebonite more extensively in carving statues and sculptured works.

Suggestions

Notwithstanding the large use of rubber today in various fields of manufacture, its applications may be said to be just beginning, so great are the possibilities for its use.



Rubber Printing Rolls

It is bound to play an important part in the campaign now under way in larger cities to eliminate or deaden noise wherever possible. It is certain to become more a factor in building construction. Suggestions as being brought forward daily involving some new application of rubber. Only recently the lining of bath-tubs was advocated by a contemporary journal. Crepe rubber has been suggested as a substitute for sponges. Hard rubber has been mentioned in the manufacture of cut-up puzzles. Rubber bicycle saddles and even sponge rubber saddles for equestrians have been mentioned. Within the last fortnight, an inventor visiting these editorial offices, brought forward a suggestion for using molded rubber or old tires as bumpers on tugboats and watercraft.

The field of possible applications for rubber seems to be without limitations.

Extra copies of the Index to Volume 29 of THE RUBBER AGE may be secured upon request. It is printed as Section II of this issue.

Carryover of RUBBER FOOTWEAR *Rises Sharply*

THE Bureau of Foreign and Domestic Commerce announces that as a result of the survey of dealers stocks of waterproof rubber footwear as of March 1, 1931, made by the Rubber Division, 20,400 dealers reported 6,109,033 pairs on hand, an average of 299.5 pairs per dealer, against 22,752 dealers with 5,748,984 pairs, or 252.7 pairs per dealer, on March 1, 1930.

As with the periodical surveys of dealers stocks of radio equipment and automobile tires made by the Department of Commerce in recent years, this survey was made to provide basic information contributing to trade stability. The market for rubber footwear is highly seasonal and confined mostly to the winter months; demand varies with winter weather conditions; and the market is complicated by frequent changes in design and color of ladies' gaiters to correspond with more exacting style demands. Consequently, there is always uncertainty in market conditions often leading to scarcity or surplus of supplies, either of which is an economic loss divided between manufacturers, dealers, and consumers. There is a carryover of stocks both by dealers and manufacturers at the end of every season. The present and subsequent annual surveys will help determine the extent of the normal dealer carryover, and enable manufacturers and dealers to judge how business, during the coming season, may be affected by the carryover, both for individual States and the country as a whole.

The varying market demand for rubber footwear in different parts of the United States is indicated by the percentages of dealers reporting stocks of each class of footwear for each region. For example, taking the total number of reporting dealers in New England as 100 per cent, the table shows 63.2 per cent of these dealers handling lumbermans and pacs, and 93.6 per cent handling rubbers, the highest percentage with stocks of these items in any region. The West South Central States, although furnishing a poor market for rubber footwear generally, show a higher percentage of dealers stocking rubber boots than any other area. The demand for rubbers and rubber boots varies less than for other items in different parts of the country. Arctics and gaiters of all kinds are most generally stocked in the North Central, New England, and Mid-Atlantic States.

In order to show the percentage of dealers holding stocks of various volumes, special tabulations were made of dealers stocks of (a) rubbers and (b) total rubber footwear. This table (a) shows 55.0 per cent of the dealers with stocks of less than 100 pairs of rubbers, 30.0 per cent having stocks between 100 and 249 pairs, and so on. On March 1, 1930, there were 172 dealers with stocks of 1,000 or more pairs of rubbers, their total stocks being 632,228 pairs, compared with 162 dealers with 621,828 pairs on March 1, 1931. Under (b) the table shows the number of dealers and volume of stocks of all waterproof rubber footwear in various groups and the percentage of total stocks is shown also for each group.

The average volume of total stocks *per dealer in each group* shown was closely comparable in 1930 and 1931; the over-all average per dealer increased sharply because the percentage of dealers reporting stocks under 100 pairs was so much less in 1931 than in 1930 (38.2 per cent against 45.3 per cent). The smaller total number of reporting dealers has no connection with the smaller number reporting stocks under 100 pairs; the indication is simply that more dealers are now holding stocks of over 100 pairs than in 1930.

Another table reports the March 1, 1931, stocks of the

TOTAL REPORTED STOCKS, SHOWING AVERAGE PAIRS PER DEALER

	March 1, 1930			March 1, 1931		
	Number of Dealers	Number of Pairs	Pairs per Dealer	Number of Dealers	Number of Pairs	Pairs per Dealer
Rubber boots	16,673	550,250	33.0	15,494	535,141	34.5
Lumbermans and pacs	8,605	243,465	28.3	8,091	253,785	31.4
Heavy arctics and gaiters	13,423	473,351	35.3	12,886	585,444	45.4
Light arctics and gaiters	12,332	608,678	49.4	11,916	608,470	51.1
Style gaiters, cloth	11,015	628,513	57.1	10,562	611,884	42.1
Style gaiters, rubber	8,783	374,921	42.7	9,868	660,368	66.9
Light & heavy rubbers	19,049	2,869,805	150.7	17,590	2,853,941	162.2
	22,752	5,748,984	252.7	20,400	6,109,033	299.5

PERCENTAGE OF DEALERS REPORTING EACH CLASS OF FOOTWEAR, BY REGIONS

Regions	Rubber Boots Per Cent	Lumbermans & Pacs Per Cent	Arctics and Gaiters: Heavy Per Cent	Arctics and Gaiters: Light Per Cent	Style Gaiters: Cloth Per Cent	Style Gaiters: Rubber Per Cent	Rubbers Per Cent	Total Dealers Per Cent
New England	75.3	63.2	66.8	69.3	56.5	48.8	93.6	100.0
Middle Atlantic	78.1	58.9	72.5	70.0	58.2	53.2	90.6	100.0
E. No. Central	81.1	52.7	81.6	73.7	64.1	60.4	92.4	100.0
W. No. Central	72.2	32.7	83.4	77.3	63.8	59.0	89.1	100.0
So. Atlantic	6.81	25.4	43.8	35.7	34.0	32.9	86.1	100.0
E. So. Central	73.3	18.9	37.5	31.0	32.3	30.8	75.4	100.0
W. So. Central	87.4	9.6	28.4	36.3	30.9	32.8	60.9	100.0
Mountain	65.6	42.2	73.6	60.4	53.8	45.3	82.4	100.0
Pacific	74.9	22.8	22.1	17.8	38.3	39.5	84.9	100.0
Total U. S.	76.0	39.7	63.2	58.4	46.9	48.4	82.2	100.0

DEALERS CLASSIFIED BY VOLUME OF STOCK

	Rubbers Only				Total Rubber Footwear			
	Dealers		Stocks		Dealers		Stocks	
Volume of Stocks	Number	% of Total	Pairs	% of Total	Number	% of Total	Pairs	% of Total
1-99	9,682	55.0	416,785	14.6	7,790	38.2	413,221	6.8
100-249	5,273	30.0	822,893	28.9	6,209	30.5	1,015,303	16.5
250-499	1,952	11.1	657,819	23.0	3,844	19.0	1,365,691	22.4
500-999	521	3.0	334,616	11.7	1,885	9.2	1,275,519	20.9
Over 999	162	0.9	621,828	21.8	632	3.1	2,039,299	33.4
Total	17,590	100.0	2,853,941	100.0	20,400	100.0	6,109,033	100.0

NUMBER OF MAKES OF FOOTWEAR HANDLED

	March 1, 1930		March 1, 1931	
Makes Handled	Dealers	Per Cent of Total	Dealers	Per Cent of Total
Not reporting	4,523	19.9	5,477	26.9
One Make	7,219	31.7	5,820	28.5
Two Makes	6,991	30.7	5,749	28.2
Three Makes	2,610	11.5	2,151	10.5
Four Makes	759	3.3	587	3.0
Five Makes	295	1.3	252	1.2
Six Makes	158	0.7	173	0.8
Seven Makes and Over	197	0.9	191	0.9
Total	22,752	100.0	20,400	100.0

various classes of waterproof rubber footwear, by States according to the geographical regions to which they belong. The State with the highest average stocks was Massachusetts (643.6 pairs), followed by Illinois (568.2), New York (464.9), and the District of Columbia (433.4). States with the lowest average stocks were Mississippi (59.7), Louisiana (72.8), Arizona (78.1), and South Carolina (80.1). It will be noted that, naturally, the highest stocks were reported in the New England, Mid-Atlantic, West North Central, and East North Central States, or industrial regions, while the lowest stocks were in the agricultural South Central States, where the winter season is less severe than in the North.

No Trend to Brand Specialization

As in previous surveys, dealers were asked to state the number of different makes of rubber footwear they handled. In the 1930 survey 4,523 dealers did not answer this question, and in the present survey 5,477 dealers failed to reply to this particular question. This year a smaller percentage of dealers reported that they were handling from one to five makes than reported in 1930. Of the dealers who actually answered this question, the percentage handling one make only was 39.0 this year agains 39.6 last year, those handling two makes amounted to 38.5 against 38.4 last year—such an analysis gives no indication of any significant change.

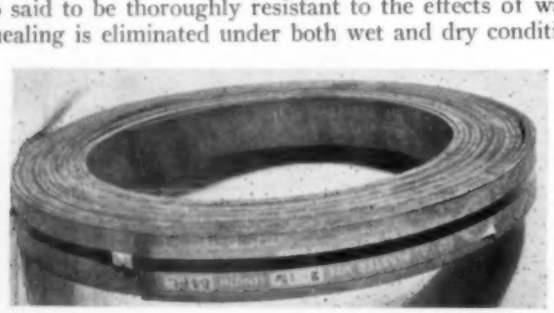
The mailing list used for the survey of March 1, 1931, consisted of 97,800 names, against 117,750 names a year previous and 131,500 names in July, 1929. The reduction in the mailing list resulted from removal of duplicates and from corrections reported in previous surveys.

In addition to the 20,400 live returns, there were returned by Post Office authorities about 1,500, and there were received back from dealers who reported "no stocks on hand" or "out of business" about 4,000 reports, making total returns 25,900, the comparable figure for 1930 being 29,790. Total returns thus amounted to 26.5 per cent of the mailing list this year, against 25.3 per cent last year; returns reporting stocks amounted to 20.86 per cent against 19.32 per cent last year.

Latex Bonded Brake Lining

A NEW flexible molded brake lining has just been announced by the Tire Department of the U. S. Rubber Company, Detroit.

In this new type of brake linings, known as "U. S. Royal Master Latex Bonded," a marked increase in heat resisting qualities is said to have been obtained, while it is also said to be thoroughly resistant to the effects of water. Squealing is eliminated under both wet and dry conditions,



due to the smoothness with which the braking surface adjusts itself to the drum.

The patented processed method of bonding selected asbestos with latex produces a uniform brake lining, giving an even coefficient of friction in all weathers through the life of the lining. Its density and strength resists hot drums without swelling and without drum scoring, and gives it outstanding wearing qualities. Tests over a period of months and under all kinds of road conditions show that the use of this lining gives an entirely new braking sensation.

The new type of brake lining is easily installed, coming in rolls made of 4 coils each 13½ feet long. This molded lining is flexible so that it can be fitted to any size drum. It is only necessary to have coils in 8 to 12 different sizes to service all the cars on the road. This results in a minimum inventory for the dealer and the distributor and replaces the multiplicity of sets where the dealer attempted to service cars with rigid segments of brake lining.

An outstanding characteristic of the latex bonded molded lining is that it retains its flexibility without aging on the shelf. But, when applied to the shoe, and in contact with the hot drum, it turns into a rigid segment.

Report of Committee D-11

IMPORTANT changes in the American Society for Testing Materials specifications under its jurisdiction were approved for recommendation to the Society, by Committee D-11 on Rubber Products, at its meeting on March 18, 1931, at the Hotel William Penn in Pittsburgh. The meeting was held in conjunction with the spring group meeting of American Society for Testing Materials committees.

The Tentative Specifications for Insulated Wire and Cable (D 27-28 T) are to be amplified by the inclusion of a table giving standard thickness of lead sheath and a section giving standard practice for braiding. The committee also approved revisions in the chemical and physical requirements of the present specifications which will permit the use of organic accelerators and antioxidants in the rubber insulation compounds.

The Geer oven and Bierer-Davis oxygen bomb aging tests were included in the specification requirements when organic accelerators and antioxidants are used.

In the Tentative Methods of Chemical Analysis of Rubber Products (D 297-29 T) the section dealing with definition of acetone extract was revised so as to take into consideration the effect of the presence of organic accelerators and antioxidants. No change was considered necessary in the method of making the determination of acetone extract but the revised definition will aid in proper interpretation of the results of the test.

In the Standard Methods of Testing Rubber Products (D 15-24), revisions of some of the sections on physical tests were approved so as to bring these methods more in conformity with generally accepted practice. For instance, it was decided to permit testing 24 hours after vulcanization and to require that, except by mutual agreement, specification tests must be performed within 60 days after vulcanization. The grade of gasoline specified for use in separation of rubber from cotton fabric was changed and the time required for bringing the sample to the test temperature was shortened. The recommendation that the standard micrometer should exert a pressure on the specimen of 9 oz. plus or minus one-tenth of an ounce, was accepted to replace the former limits of 8 to 10 oz.

It is planned in the Subcommittee on Physical Tests to make a thorough study of existing performance tests with a view toward including suitable ones in a contemplated revision of the present methods of test. A section was authorized to concentrate on this work with instructions to devote attention first to methods for testing V-bolts. A section was also authorized in the Subcommittee on Insulated Wire and Cable to cooperate with the Specification Committee of the National Electrical Manufacturers Assn., in the interest of standardization.

Plans were completed for a Symposium on Abrasion Testing of Rubber Products to be held in connection with the Annual Meeting of the Society in Chicago, June 22-26 ,1931. Five papers of unusual interest have been promised for this symposium. A feature of this meeting will be an open discussion of abrasion testing and related tests including those of tearing, shearing, and cutting resistance of rubber compounds. Those interested in contributing to the Symposium or to the discussion are invited to communicate with Dr. H. A. Depew, New Jersey Zinc Co., Palmerton, Pa.

Accelerated Discoloration Tests for White Rubber Products and Methods of Measuring the Extent of the Discoloration*

By Harlan A. Depew

The New Jersey Zinc Company, Research Division, Palmerton, Pa.

DURING the past two or three centuries there has been considerable discussion as to whether light consists of a stream of corpuscles or of a wave motion in ether, with present day thought generally agreeing that it may be considered best as a particle associated with a wave motion. Without going into the fundamentals of this question, it should be enough to say that light has an apparent wave length that can be measured and that it can be classified with radiation in general. Figure 1 shows this classification and it is to be noted that visible light constitutes only a very

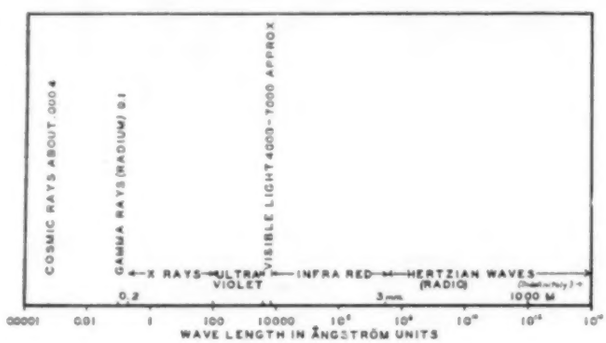


Fig. 1

An Approximate Classification of Radiation on a Log to Base 100 Scale

small part of the total radiation. It also constitutes only a small part of the radiation from the sun, extending from 4000 Ångströms to 7000 Ångströms compared with a range of from about 2900 to 53000 for the radiation from the sun. The radiation in this small section from about 4000 to 7000 Ångströms contains the only wave lengths that cause the sensation of color, and accordingly is the only part that needs to be considered in the measurement of color. In the case of the discoloration of white rubber, other wave lengths, especially those shorter than the blue, affect the color. Accordingly, in the study of accelerated methods, a range of wave lengths on both sides of the visible spectrum will be considered.

When light impinges upon a surface, part of it is absorbed and part reflected. If the reflected light is of a relatively short average wave length (4600 Å or 460 millimicrons), the surface will appear blue, and if it is of a relatively long wave length (6300 Å), it will appear red. The wave lengths other than blue and red respectively are, of course, absorbed. If most of the light is absorbed non-selectively, the surface will appear black, and if a large part of it is reflected from a non-selective surface and the source is the midday sun (with the blue skylight excluded) the surface will be white. (Non-selective absorption means that the ratio of reflected to incident light for all wave lengths is constant.) This definition of white is arbitrary in that the composition of white light has been chosen as that from the noonday sun. The color characteristics of a surface involve not only the extent to which the light which is reflected from the surface deviates from white light, but also involves the quantity of light that is reflected. If 10 per cent of the incident white light is absorbed and 90 per cent is reflected non-selectively, in one case, and if 20 per cent of the light is absorbed and 80 per cent is reflected non-selectively in another, the former will be brighter but both surfaces will be white. Accordingly, instead of saying that one surface is whiter than the other, it is preferable to say that one surface is brighter than another and that one surface has a yellow or some other tint, as the case may be.

*Presented before the New York Rubber Group, October 23, 1930. A more complete discussion of this subject will be found in a Research Bulletin (1931) of The New Jersey Zinc Company entitled "Fundamental and Practical Aspects of the Compounding and Testing of White Rubber."

Methods for Measuring Color

For determining the relative color of two surfaces, the eye is a good indicator and direct comparisons are used largely in color work. The eye is not able to express color in absolute units, however, and a series of color standards are necessary. These color standards changes with time, and accordingly, it has been found desirable to use instruments for this purpose.

Blocks of magnesium carbonate or surfaces properly coated with MgO from burning magnesium ribbon are very bright and nearly

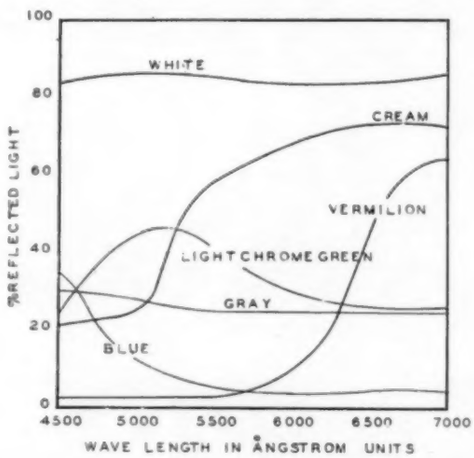


Fig. 2

Brightness Wave Length Diagram for Several Colors

non-selective and serve satisfactorily as standard surfaces for use in optical measurements.

Of the instruments that are available for measuring color, this discussion is limited to two; the Pfund colorimeter and the K. & E. color analyzer. When a sheet of yellow paper is folded into a V, the color within the V will be deeper than the color of the paper in a flat sheet. A surface is colored, as has been said before, because it absorbs the wave lengths corresponding to the other colors, or to put it differently, color is developed through the loss or scattering of some of the components that go to make up white light. Accordingly, in the case of the folded yellow paper, white light strikes the first surface of the paper and a greater percentage of the non-yellow light is absorbed than of the yellow. This process is re-

peated upon reflection from the second surface and the percentage of yellow in the reflected light increases. Pfund has utilized this principle of multiple reflection in his colorimeter and through the use of colored screens compares the brightness of a standard with that of a test surface at several wave lengths.

The K. & E. color analyzer passes light reflected from two equally illuminated surfaces, one a standard and the other an unknown, through a prism to obtain monochromatic light. The in-

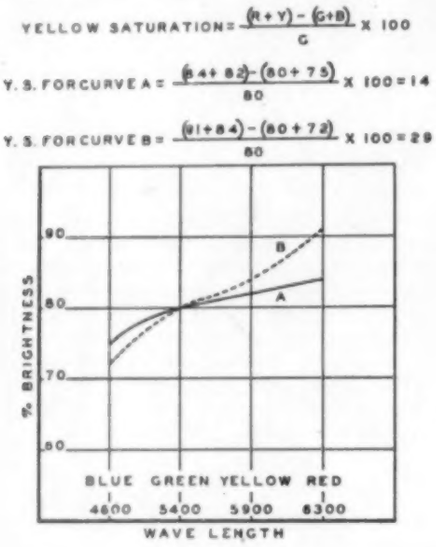

YELLOW SATURATION = (R+Y) - (G+B) / G X 100
Y. S. FOR CURVE A = (84+82) - (80+75) / 80 X 100 = 14
Y. S. FOR CURVE B = (91+84) - (80+72) / 80 X 100 = 29
% BRIGHTNESS
90
80
70
60
B
A
BLUE GREEN YELLOW RED
4600 5400 5900 6300
WAVE LENGTH

Fig. 3
Yellow Saturation of Two White Surfaces of the Same Green Brightness

tensity of the monochromatic beam of light from the standard surface is reduced by passing it through a variable rotating sector until the brightness of the standard is equal to that of the unknown. By repeating for other positions of the prism the intensity of the colored light is reflected by the surface can be measured throughout the visible spectrum.

The Pfund colorimeter is the more accurate instrument in measuring the brightness of white rubber. It absorbs so much light, however, due to the multiple reflections that it can only be used on relatively bright surfaces. In the case of deeply colored or discolored surfaces accordingly, the K. & E. instrument is necessary.

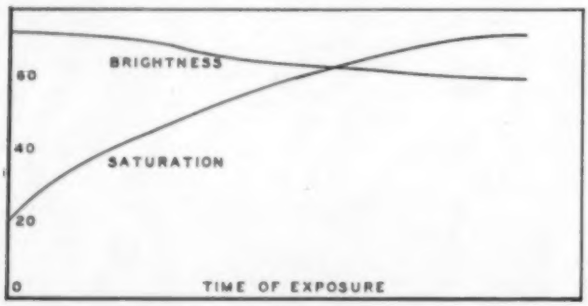


Fig. 4
Progressive Discoloration of White Rubber on Continued Exposure to Sunlight

This instrument has an advantage in that a test can be made on a small piece, one inch square, whereas the Pfund instrument requires a test surface four inches square. A serious difficulty with the K. & E. instrument is that the temperature may become so high that discoloration develops during the test. Accordingly, it is desirable, following the test, to make a color comparison (by eye) of the tested slab with a duplicate untested slab and to reject the test if there is serious discoloration.

Figure 2 shows the brightness wave length curves for a number of colored surfaces, that have been obtained through the K. & E. color analyzer.

Saturation is a term used in color work to refer to the purity of a color sensation. If the only light reflected from a surface consisted of a narrow band of wave lengths, the color could be spoken of as pure and the saturation for those wave lengths (that hue) would be high. In the case of white surfaces, the deviation from non-selective is shown by the deviation of the brightness wave length curve from a horizontal straight line and the following empirical formula has been found in general to produce values that parallel the true yellow saturation:

$$\text{Yellow saturation} = \frac{(R + Y) - (G + B)}{G} \times 100$$

R = Red brightness
Y = Yellow brightness
G = Green brightness
B = Blue brightness

Inasmuch as the sensitivity of the eye lies in the green spectrum and since approximately white surfaces are being investigated, the

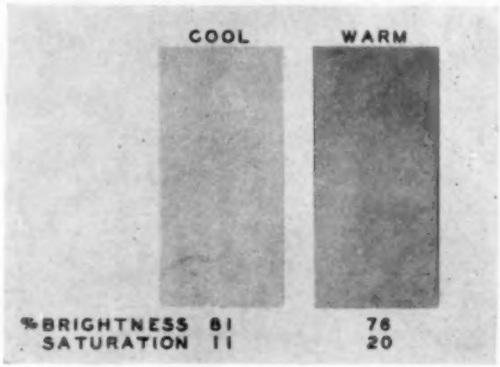


Fig. 5
The Influence of a Difference in Temperature During Exposure of White Rubber to Window Glass Filtered Sunlight on Its Discoloration

brightness of the surface in this region may be taken as the average. In general, it is unnecessary to give the complete wave length brightness diagram for describing "white" products. The yellow saturation and the green brightness that in the future will be referred to as brightness and saturation, are sufficient to define the surface for most purposes and the use of two significant figures greatly simplifies the tabulation of data. Figure 3 shows two curves of the same brightness but of decidedly different saturation; curve A with the lower saturation is the better white. The best white is obtained with as near to 100 per cent brightness as it is possible to obtain and with zero saturation. After a little experience these figures

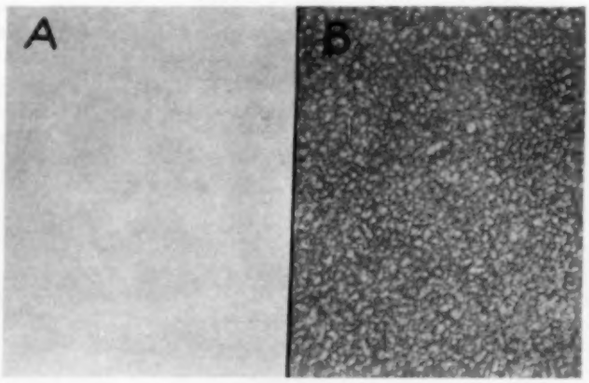


Fig. 6
Mottling Caused by Freezing
A—Before exposure
B—After exposure to light and to freezing

for saturation and brightness will be extremely significant to an investigator working in this field.

Factors That Influence Discoloration

All colored materials tend to change color (fade or discolor) as time passes, and the discoloration may be especially severe when the colored surfaces are exposed to light. White rubber products are no exception as would be expected when one considers the various organic materials added to them. The complete story of discoloration is a long one and so this discussion is limited to the yellowing of vulcanized rubber that is caused primarily by sunlight. Figure 4 illustrates how samples progressively discolor on exposure to sun-

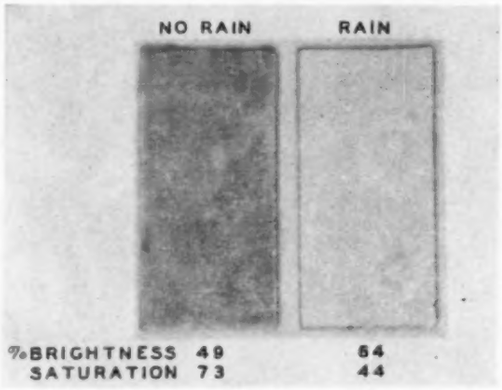


Fig. 7
The Effect of Rain on the Discoloration of White Rubber
(The two samples were exposed on a 45° southern exposure test fence; one sample being shielded during rain.)

light over a period of time. The discoloration is influenced by the temperature, probably by the humidity, by rain, and by the character of the light. An increase in temperature causes a decided increase in yellowing as is shown in Figure 5. The relatively light colored sample was exposed to sunlight through window glass in a well ventilated box that kept the temperature down, whereas the discolored sample was kept in an unventilated box and the temperature was about 20°C. higher. As might be expected from the simultaneous effect of low sunlight intensity and low temperature in winter, very little discoloration occurs. The importance of temperature suggests that the therapeutic and color effects of ultraviolet light may be greatly influenced by the infra red rays that increase the surface temperature. Freezing temperatures may produce a mottling effect on discolored rubber as is shown in Figure 6. The yellow discoloration on the surface of rubber is somewhat

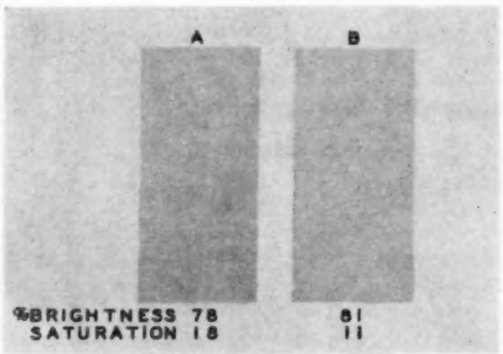


Fig. 8
The Effect on the Shorter Waves in Sunlight Upon Discoloration
A—Effect of sunlight passed through Corex glass that does not stop the shorter wave lengths.
B—Effect of sunlight passed through window glass that cuts off the light below 3200 Å.

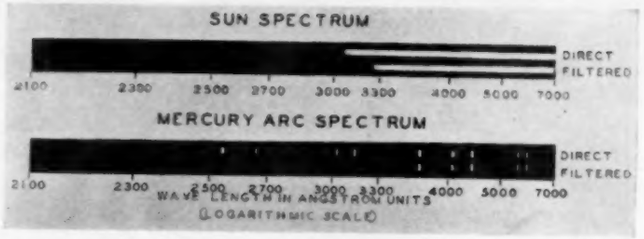


Fig. 9
A Photographic Comparison of the Mercury Arc Spectrum with that of Sunlight Showing the Effect of an Ordinary Window Glass Filter

water soluble and Figure 7 shows that the effect of rain over a period of time is to "whiten" the compound. The mottled discoloration developed by freezing washes off in the rain with unusual ease. This washing off of the discoloration on exposure to the weather is the reason that pieces of white rubber that have been exposed for some time to weather conditions are usually good "whites."

White light was defined earlier as light from the noon-day sun. The composition of sunlight is sufficiently different at different parts of the day so that in the case of paints it has been possible to obtain different orders of discoloration, depending in the time of day that the exposure was made. Although there is no available evidence that small differences in the character of the light affect the relative discoloration of different rubber samples, the removal of some of the shorter wave lengths of light from sunlight greatly reduces the extent of the discoloration. Figure 8 compares the result of exposure of a sample to sunlight, filtered through ordinary

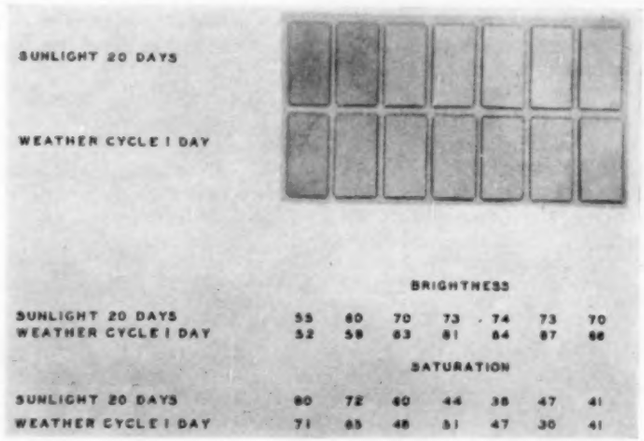

SUNLIGHT 20 DAYS
WEATHER CYCLE 1 DAY
BRIGHTNESS
SUNLIGHT 20 DAYS 55 60 70 73 74 73 70
WEATHER CYCLE 1 DAY 52 58 63 61 64 67 66
SATURATION
SUNLIGHT 20 DAYS 80 72 60 44 38 47 41
WEATHER CYCLE 1 DAY 71 65 48 31 47 36 41

Fig. 10
Comparison of the Discoloration after 20 Days Outdoor Exposure as Compared with One Day in the Accelerated Test

window glass which cuts out the light below 3200 Å, with the result of exposure to sunlight that has been filtered through Corex glass, which transmits down to about 2700 Å, and therefore does not hold back any of the sun's rays. The results show that the wave lengths from the lower limit of sunlight at 2900 Å to 3200 Å have a decided influence on the discoloration of rubber.

Accelerated Tests

Since the different factors that go to make up weather have a different effect on the discoloration of rubber, it is obvious that consistent results cannot be obtained by direct exposure in most localities, although good results might be possible in extremely dry warm climates where there is a great deal of sunshine. Accordingly, it is desirable to consider accelerated tests. For this purpose artificial light is necessary and there are two sources available; the mercury arc and the carbon arc. Figure 9 shows that the spectrum developed by the mercury arc is entirely different from that of sunlight; it consists of a line spectrum extending to very short wave

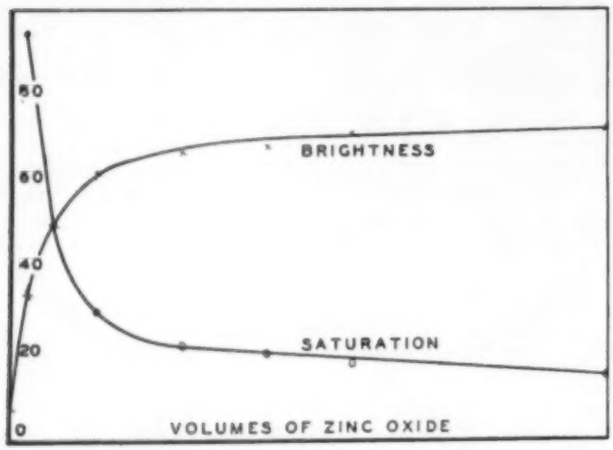


Fig. 11
The Effect of an Increasing Zinc Oxide Content on the Whiteness of Rubber

lengths as compared with a continuous spectrum for sunlight that extends down to only about 2900 Å.

An accelerated method that has been worked out in paint testing uses a special mercury arc lamp and it was tentatively adopted for convenience in this rubber work. Figure 10 shows a favorable comparison of the accelerated test with an outdoor exposure. This test involves a weather cycle of light, water spray, and freezing that approximates Palmerton, Pa., weather. The temperature variation within the cabinet is too great to permit as high an accuracy as might be desired on one day exposure tests which are too short for variations to be averaged and it would appear desirable in rubber work to apply an accurate temperature control, and to set the temperature relatively low, during the light exposure not to exceed 120°F.

A carbon arc can be obtained that will develop a spectrum almost identical with that of sunlight. The arc generates more heat and makes the problem of temperature control more difficult. It also gives off gases and requires more care and accordingly it will only be adopted for accelerated tests, if a series of experiments now in progress show that the correlation with sunlight exposures is appreciably better than can be obtained with the mercury arc.

The Application of Pigments

As an illustration of how these methods of measuring the amount of discoloration can be applied to rubber compounding, Figures 11 and 12 are presented. The former gives a permanent record in graphical form, showing how increasing the amount of

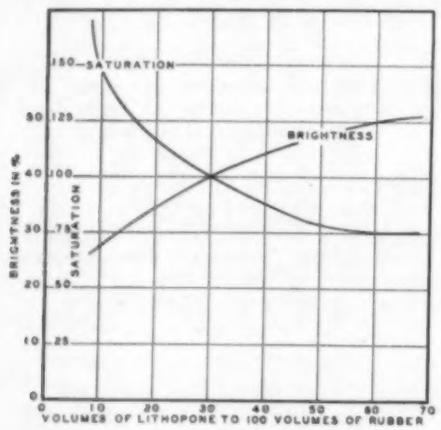


Fig. 12
The Effect of an Increasing Lithopone Content on the Discoloration

zinc oxide improves the initial color of the rubber stock and the latter gives a graphical record showing that there is less discoloration in a high lithopone content stock than in a low content lithopone

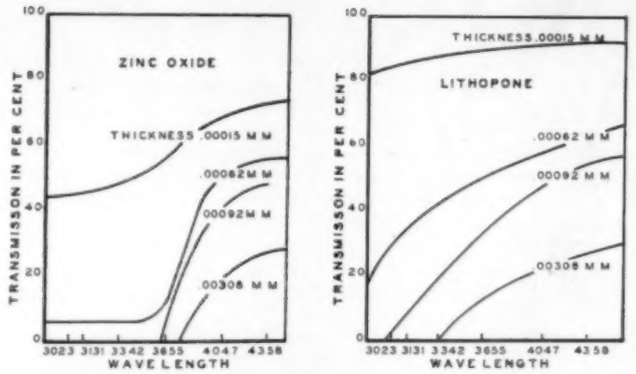


Fig. 13
A Comparison of the Opacity of Zinc Oxide and Lithopone Stocks

stock. Although high lithopone stock reduces the discoloration, zinc oxide is even more effective as is shown in Table 1.

TABLE 1
The Effect of Zinc Oxide in Preventing the Yellowing of Lithopone Stocks

Volumes of Pigment to 100 of Rubber		*Brightness*	*Saturation*
Lithopone	*Zinc Oxide*	(10 *Days' Exposure to Direct Sunlight*)	
19	1	66	42
18	2	66	52
15	5	77	31
10	10	76	26
5	15	78	27
0	20	78	21

The difference in discoloration shown by two white stocks that are identical, except for the pigment, is probably largely physical although chemical activity plays a part in cerain cases. Various pigments have decidedly different opacities according to the wave lengths of the incident light. The white pigment with the highest opacity to the shorter wave lengths of sunlight will allow this light to penetrate to a minimum depth and therefore will limit the discoloration to this depth. Or to state the matter differently, the amount of yellow formed will be proportional to the pigment's opacity to the discoloring wave lengths. The whitening strength of the pigment which is the other physical factor that determines the discoloration measures the pigment's power to overcome the yellow color. Accordingly, disregarding for the moment the chemical effect of the pigment, the value of a pigment in resisting the discoloration of rubber will be measured by the product of the opacity and whitening strength.

Figure 13 compares the opacity of zinc oxide with that of lithopone. A layer of zinc oxide 0.0009 mm thick will prevent a wave length of 3655 Å from passing through whereas a layer 0.01 mm thick is required in the case of lithopone. Since the whitening strength of lithopone is only about 10 per cent greater than that of zinc oxide on a volume basis, the value of zinc oxide on a volume basis, the value of zinc oxide in preventing discoloration as shown in Table 1, was to have been expected.

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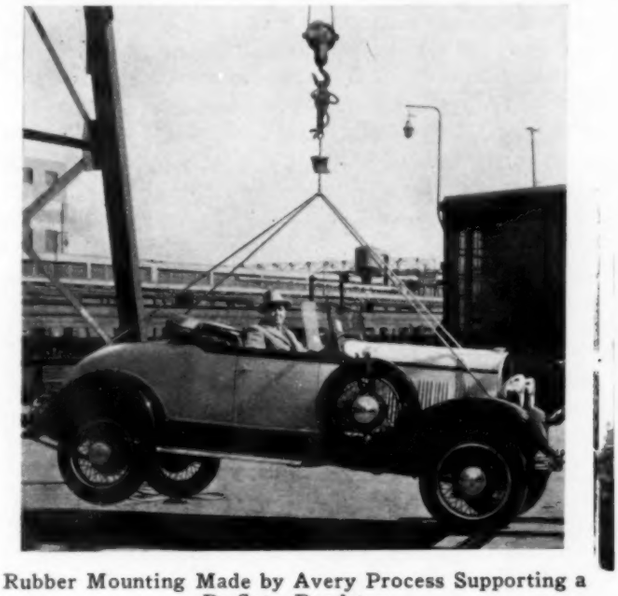
Avery Process Now Available

ANNOUNCEMENT has recently been made of the availability to rubber manufacturers in general of the Avery process of rubber-on-metal. This well-known method of bonding rubber to metal is the result of many years of metallurgical and rubber development by Edward S. Avery and up to recently rights to its use had been vested exclusively with one of the larger rubber companies. Rubber-on-metal products can now be offered by any rubber manufacturer without the huge investment formerly required.



Rubber Mounting Made by Avery Process Supporting a De Soto Roadster

Ferrous and non-ferrous metal parts, made to order for bonding with rubber during vulcanization, are now available at New York City and will be available later at Buffalo, Akron, Detroit, Chicago, and on the Pacific Coast.

Metal parts for bonding with rubber may be purchased in advance of requirements, and kept in stock indefinitely. Large or small wire, thick or thin sheets, stampings, castings and forgings are obtainable. All metal processes in the rubber plant are eliminated, except possibly the removal of finger-prints with gasoline.

The bond between the rubber and the metal is stronger than the rubber itself. The bond is not affected by rust or atmospheric heat and is good for the life of the rubber. It is said to be uniformly reliable, thus eliminating defectives.

New rubber-on-metal products are available to those desiring them. For example, a smooth metal paper-roller may be covered with soft rubber without the use of a hard rubber base. Pulleys and wheels may be covered; an elastic rubber spring suitable for light or heavy loads is available; and there is a rubber foundation for marine or other engines, which eliminates vibrations from ships. A universal joint for such engines is also available.

Rubber factories interested in developing a line of rubber-on-metal products may avail themselves of Mr. Avery's research and development facilities.

Rubber Boot and Shoe Sales in 1931

ABOUT half of the rubber boot and shoe manufacturers wholesale their own commodities, and likewise about half of the industry's production is sold through wholesale branches, according to Edward R. Dewey, chief of the Industrial Marketing Section, Bureau of the Census.

Data gathered in the Census of Philadelphia shows that 52.4 per cent of rubber boots and shoes sold by manufacturers in 1929 went through wholesale branches as

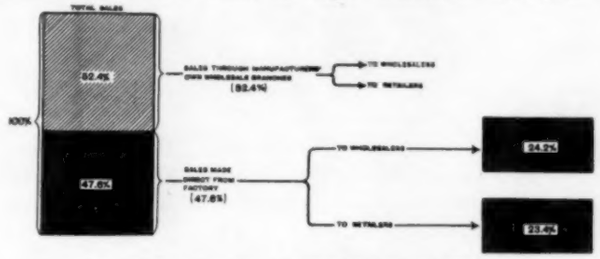


Diagram Showing Distribution of Rubber Footwear Sales, 1929

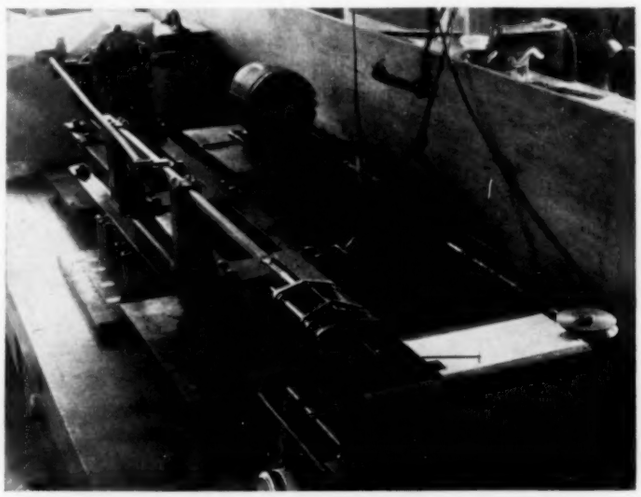
against 24.2 per cent to wholesalers proper and 23.4 per cent to retailers.

Sales by rubber boots and shoe manufacturers in 1929 totaled $102,538,000. Of this, $53,661,000 was accounted for through invoices to wholesale branches, $24,846,000 was sales to wholesalers, and $24,031,000 sales to retailers.

There were 22 establishments reporting as being primarily engaged in the production of rubber boots and shoes in 1929. Eleven reported sales through wholesale branches; 13 to wholesalers and 9 to retailers. None reported sales through manufacturers' agents, selling agents, brokers, or commission merchants.

Multiple Cycle Stress-Strain Machine for Rubber

THE Bureau of Standards, at Washington, D. C., has recently announced the building and installation of a machine for automatically recording stress-strain properties of rubber compounds. The machine, which is designed for investigational work on the properties of rubber, is arranged for operation in many different ways.



The speed may be varied within quite wide limits down to about 1 cycle per second.

Ring test specimens 2 inches inside circumference are ordinarily used and may be stretched any amount up to 1,000 per cent. By means of a series of calibrated springs the capacity of the machine may be set at values beween 5 and 50 pounds; thus, a spring may be used to suit the particular sample under test. The stress-strain curves which are usually complete hysteresis diagrams are recorded on waxed stylograph paper.

EDITORIAL COMMENT

Rubber Goods Sales Through Drug Stores

THE rubber goods manufacturing industry can very profitably watch the outcome of the National Drug Store Survey which the Department of Commerce is about to undertake in St. Louis, Mo. A. L. Viles, secretary of the Rubber Manufacturers Association, is serving on the committee of Allied Industries which is cooperating in the survey.

In a recent interview in which he outlined the purposes of the survey and how it touches the rubber goods industry, E. G. Holt, chief of the Rubber Division of the Department of Commerce, called attention to the fact that "the alert sales strategy of the rubber goods industry has been quick to seize upon the expanding possibilities in this evolution of the drug store. The customary lines of drug rubber sundries and surgical rubber goods on the druggist's shelves have been steadily supplemented by a wide range of diversified rubber articles running all the way from sports goods to nursery wares.

"The citizen who yesterday turned as a matter of course to the drug store for a hot water bottle, ice bag, spray, syringe, adhesive or bandages, today is just as apt to step in to purchase anything from a rubber apron for the kitchen to a bathing cap for the pool, hard rubber toiletries for the boudoir, rubber toys, bibs, and baby pants for the nursery, golf balls, tennis balls, or any of twenty other rubber products which might be named. While no official figures are available, it is certain that an important and growing volume of miscellaneous rubber goods sales, running well into millions annually, is being handled through the drug stores.

"The rubber goods industry therefore has a first-hand interest in the progress of drug store merchandising, and consequently in the National Drug Store Survey which is being made at the request and with the cooperation of thirty trade organizations, including the Rubber Manufacturers' Association, Inc., representing industries that use the drug store as a sales medium for their goods.

"The work of the National Drug Survey is planned to extend over a period of one year, beginning about April 1. Ten drug stores, including two chain units, in the city of St. Louis and one store in a nearby small town will be used as laboratories for the merchandising studies whose applications are expected to be national in scope.

"The survey is designed to throw light on the conditions of profitable and unprofitable operation not only for the stores as a whole but also with regard to the individual commodities handled. Separate sales and cost data will be determined for each of some 5,000 to 10,000 drug store items, over the entire test period of a year.

"From this the proprietor may learn just how much the sale of rubber gloves, say, or water bottles, or golf balls, contributes to his growing volume, what share of his overhead is chargeable against them, and what his real margin of profit is on each. He will learn how his rubber goods lines compare with other departments of his store in turnover, and in ratio of profits to stock outlay and space required.

"The survey is expected to uncover many cases where more skillful merchandising methods enable one store to show satisfactory profits on an article which in another is carried at a loss. Every article so transferred from the red ink to black is that much gain for the manufacturer and distributor, whether the item is a rubber apron or a fountain syringe.

"In addition to this detailed study of merchandising operations the National Drug Store Survey will include an analysis of market conditions and consumer demand which it is believed will help to guide the druggist in providing more saleable goods to his customers, and incidentally offer some useful hints to manufacturers.

"Wholesalers and manufacturers are also expected to benefit from a review of the druggist's relations with his sources, which will endeavor to indicate ways in which the cost of purchase transactions to both retailer and distributor may be lowered.

"The cost of the National Drug Store Survey is estimated at about $50,000, which is being collected by the Finance Committee of the Survey through contributions from various branches of the drug and allied trades.

"The Commerce Department will contribute an approximately equivalent amount in the services of nine trade specialists of the Bureau of Foreign and Domestic Commece who will supervise the various phases of the study, and a staff of clerks and research assistants in Washington to compile and collate the information as it is gathered in the field."

As the results of this survey take form they will be made available by the Department of Commerce through especially issued bulletins which should be of extreme interest and importance to the industry.

The RUBBER AGE

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Representatives in all the rubber centers of the United States, Canada, England, France, Germany and the Middle East.

The Rubber Industry's CURRENT NEWS

Financial—Personals—New Rubber Products—
Building Operations—Manufacturing—Exports

RUBBER MEN WILL SPEAK AT INDUSTRIAL CONGRESS

The Second National Industrial Congress will be held at the Public Auditorium, Cleveland, O., from April 13 to 17, together with the Second National Industrial Equipment Exposition. Featuring management, maintenance and materials handling, it is being conducted under the auspices of several engineering societies.

There will be a varied program of papers presented on scrap handling, waste elimination, management, materials handling, trucking and shipping. At a session devoted to trucking and shipping, scheduled for April 15 at 8 P. M., C. C. Stuber, manager of industrial transportation for the Goodyear Tire & Rubber Company, will speak on "Handling on Skids." At a materials handling session on April 16 at 2 P. M., H. E. Cook, of the B. F. Goodrich Company, will discuss "The Use of Rubber Products for Materials Handling."

OFFICERS ARE ELECTED BY VULCANIZED RUBBER

The annual meeting of the Vulcanized Rubber Company, Morrisville, Pa., was held recently in New York, and Stanley H. Renton was re-elected president and general manager. Other officers named at the meeting were Judson Drayton, vice-president, treasurer and general sales manager; John J. Noble, secretary; David D. Smithyman, assistant treasurer and assistant secretary; Harry J. Kappler, works manager.

Mr. Noble succeeds Albert G. Lingley, who retires as secretary, comptroller and director. Hugh A. Ross has been elected comptroller and will make his headquarters at the factory at Morrisville.

FORM NEW COMPANY TO SELL USED MACHINERY

The Industrial Equipment Company has been organized with headquarters at 126 South 14th Street, Newark, N. J., for the purpose of handling used rubber working machinery, hydraulic equipment, and machine tools of all types and descriptions.

The personnel of the new organization includes H. M. Newman, who was for a number of years connected with several firms in the rubber working field and for the past two years was engineer for one of the larger used rubber machinery dealers in the east.

HERMAN MUEHLSTEIN IS SCRAP DEALERS' CHAIRMAN

At the meeting of the Scrap Rubber Division of the National Association of Waste Material Dealers, held at the Congress Hotel, Chicago, Ill., on March 18, Herman Muehlstein was elected chairman of the division for the coming year. Mr. Muehlstein is president of H. Muehlstein & Company, Inc., New York City. He succeeds David Feinburg, of the David Feinburg Company, Boston, Mass., as leader of the scrap rubber men.

H. MUEHLSTEIN

The question of freight rates was discussed at length, and the members voted that the chairman appoint a committee to investigate freight rates and submit some recommendations to the carriers. In this connection, it was suggested that the committee confer with the rubber reclaimers through their official organization. The chairman appointed H. H. Cummings and E. B. Friedlander to this committee, giving them the privilege of increasing the committee if deemed advisable.

The meeting was held in conjunction with the 18th annual convention of the National Association of Waste Material Dealers, which extended from March 16 to 18. Carlton B. Overton was re-elected president of the association, and George Birkenstein was named first vice-president. Among the scrap rubber men elected to the board of directors were Louis Birkenstein and the Messrs. Cummings, Friedlander and Muehlstein.

AKRON CHEMISTS HEAR SEARS, ROEBUCK OFFICER

That manufacturers, to be successful, should keep out of the retail distributing field is the opinion of D. M. Nelson, vice-president of Sears, Roebuck & Company, Chicago mail order house, as expressed in a talk March 13 before 200 members of the Akron Section of the American Chemical Society. Mr. Nelson was himself a chemical engineer before he turned to the field of merchandising.

"When the producer enters distribution," Mr. Nelson told his audience, which included many Akron tire company men, "he is working at diverse ends and usually suffers at a cost of lost morale as one tries to take advantage of the other rather than attempting to equalize efficiency."

Mr. Nelson was introduced by a former classmate at the University of Missouri, Dr. W. N. Jones, superintendent of the processing division of the B. F. Goodrich Company and chairman of the Akron Section.

BOWERS VICE-PRESIDENT OF PENNSYLVANIA RUBBER

A. C. Bowers, factory manager of the Pennsylvania Rubber Company, Jeannette, Pa., since 1928, was elected a vice-president of that firm and a member of the board of directors on March 16. Prior to his connection with the Pennsylvania Rubber Company, Mr. Bowers was associated with the Mason Tire & Rubber Company, Kent, O., for six years, acting as factory superintendent from 1926 to 1928. He received his early training in the tire plants of several Akron companies.

W. A. Atkins, vice-president and superintendent of E. C. Atkins & Company, Indianapolis, Ind., was also elected a vice-president of the Pennsylvania company. E. C. Atkins & Company manufacture hardware items and mason's tools, in some of which rubber is used.

Other officers elected at the meeting last month were W. O. Rutherford, president; C. H. Wolfe, secretary; C. G. Morrill, treasurer; and A. D. Welty, assistant treasurer. The directors include F. I. Merrick, D. G. Sisterson, and the Messrs. Rutherford, Atkins and Bowers.

The New Jersey Rubber Company, Lambertville, N. J., has closed down its plant in that town for an indefinite period. The company produces reclaimed rubber.

NEW FIRM TAKES OVER OLD ERIE TIRE PLANT

The Servicized Products Company, manufacturer of expansion joints for use in road-building, has taken over the former Erie Rubber Corporation factory at Sandusky, O. The expansion joint the company makes is a composite of asphalt and rubber. M. Achterhof of Akron is chemist for the company, and E. R. Klug of Indianapolis is acting as plant manager.

The Erie Rubber Corporation manufactured tires and mechanical rubber goods until January, 1929, when it was merged with the Swinehart Tire & Rubber Company of Akron. The Sandusky factory was closed down at that time, but was taken over by the Fibrated Asphalt Company in July, 1929, and operated by that firm for a year.

MONSANTO ENDS 400 DAYS WITHOUT AN ACCIDENT

The Monsanto, Ill., plant of the Monsanto Chemical Works on March 28 completed 400 days without a lost-time accident and on March 24 established the record of one million man-hours without a lost-time accident. This plant employs 400 men in the manufacture of sulfuric acid, muriatic acid, nitric acid and other heavy chemicals.

It has been four years since a man in this plant was injured from acid or in the handling of acid, the only accidents in that period being from men falling off platforms or in ways other than from handling of chemicals. All of the seven plants of the Monsanto Chemical Works are making excellent safety records, the St. Louis plant having gone 223 days since the last lost-time accident.

Los Angeles Rubber Group

The members of the Los Angeles Group of the Rubber Division, American Chemical Society, held a meeting March 25 at the Engineer's Club, Los Angeles, Cal. F. D. Carpenter, factory manager of the Samson Tire & Rubber Company, exhibited a film entitled "The Romance of Rubber" and discussed the plantation activities of the United States Rubber Company.

Firestone Continues Dividend

The Firestone Tire & Rubber Company has declared the regular quarterly dividend of 25 cents a share on the outstanding common stock. The dividend will be paid April 20 to stock of record as of April 3.

Philip Schleussner

Philip Schleussner, first vice-president in charge of the New York office of the Roessler & Hasslacher Chemical Company, died March 21 at his home, Stamford, Conn. Mr. Schleussner was born in Brooklyn, N. Y., September 6, 1878. He was well known through the chemical trade, having been connected with Roessler & Hasslacher for 25 years, and was treasurer of the Manufacturing Chemists Association of the United States.

Herbert G. Day

Herbert G. Day, president of the Philadelphia Rubber Works Company, Akron, O., rubber reclaiming subsidiary of the B. F. Goodrich Company, died at City Hospital, Akron, following an operation. He underwent an appendicitis and gall bladder operation a week previous and complications had necessitated a second incision. Mr. Day, who would have been 49 years old next month, had attended to his duties at his office up to the day before he entered the hospital.

On February 10, 1930, Mr. Day was elected president of the Philadelphia Rubber Works Company to succeed the late John S. Lowman. He had been at that time

connected with the company for 18 years and had been chief engineer for the last 13 years of that time. He joined the firm as night superintendent and a year later went to the engineering department. In 1928 he was elected second vice-president, and in October, 1929, vice-president.

Born in Warren, O., on May 21, 1882, Mr. Day was the son of the late George E. Day, head of the Day-Ward Company, manufacturers of sanitary enamelware at that city. After graduation from Warren High School, he took a course in engineering at the Case School of Applied Sciences, Cleveland, from which he was graduated in 1905 with the degree of bachelor of science.

Mr. Day started his career in the engineering department of the Republic Iron & Steel Company, Youngstown, O., where he remained one year. The next year was spent in the engineering department of the National Tube Company, McKeesport, Pa., followed by a year and a half with the Hamilton Iron & Steel Company, Hamilton, O. He then returned to Warren to remain with the Day-Ward Company three years until it closed, and then made his connection with the Philadelphia Rubber Works Company in early January, 1912.

Willard B. Daniels

Willard B. Daniels, treasurer of Whittaker, Clark & Daniels, Inc., manufacturers and importers of mineral colors and chemicals, 245 Front Street, New York City, died suddenly of a heart attack at his home in New Dorp, Staten Island, N. Y., on March 22. He was 56 years of age and had been associated with that firm since 1918. He is survived by his widow.

DU PONT TAKES SPACE IN EMPIRE STATE BUILDING

E. I. du Pont de Nemours & Company will take space on the ninth, tenth and eleventh floors of the world's largest building, the Empire State Building at Fifth Avenue and 34th Street, New York City, as soon as it is opened on May 1. Space equivalent to the area of a 22-story building, 100 by 100 in size, will be leased for a total rental of $3,000,000 over a term of years.

The du Pont subsidiaries which will occupy the space have been scattered about Manhattan, but will in future be centralized under one roof. These companies include the Roessler & Hasslacher Chemical Company, Grasselli Chemical Company, Krebs Pigment & Chemical Company, Fabrics and Finishes, National Ammonia Company, Viscoloid Works, du Pont Rayon Company and du Pont Explosives.

Move U. S. Warehouse

In continuing its centralization policy, the United States Rubber Company is moving its sundries warehouse from Naugatuck to Providence, R. I., and it is expected that the removal will be completed by April 15. Finished sundries goods manufactured in the plants at Naugatuck will be shipped by truck to the Providence terminal in the future.

A. Gross & Company Move

A. Gross & Company, well known producers of ste ric acid especially prepared for the rubber industry, announce the removal of their New York City office on April 13 to Suite 4604, Chanin Building, 122 East 42nd Street. Their present address is 90 West Street. This company produces, in addition to stearic acid, red oil and glycerine, and has factories at Newark, N. J., and Baltimore, Md.

Rubber Stocks Close Lower

In sympathy with the rest of the market, rubber company securities closed the fortnight at lower prices. The closing quotations on April 7, compared to the close on March 19 and to the year's high and low, follow:

	Last Price		—1931—	
	Apr. 7	Mar. 19	High	Low
Aetna	—	4½	5	3¾
Ajax	—	—	½	¼
American Hard Rubber	—	35¼	35¼	30
Dayton "A"	—	—	—	—
Falls	—	—	—	—
Faultless	—	—	37	35
Firestone	16⅛	17¼	19¾	16
do. 6% pfd.	60¼	62	63	56½
Fisk	⅝	⅜	⅞	½
do. 1st pfd.	2½	2½	3	2
General	97	—	140	81
do. pfd.	—	—	87½	83
Goodrich	16	19¼	20⅞	15¼
do. pfd.	—	—	68	60
Goodyear	43¾	49½	52¾	38⅜
do. 1st pfd.	86	88½	91	81
India	12	13	13½	8⅜
Intercontinental	—	4¼	4½	2
Kelly-Springfield	2½	3⅛	3⅛	1⅜
do. 6% pfd.	41	39½	45	35
Lee	4½	4¼	4¾	3⅛
Mohawk	—	8	8	3
do. pfd.	—	—	35	35
Norwalk	—	1	1½	½
Pirelli	35⅛	—	39¾	31⅞
Raybestos-Manhattan	25⅞	27½	29½	18⅝
Seiberling	5¼	6½	7½	4¾
do. pfd.	—	—	40	33
U. S. Rubber	16¾	19⅞	20⅜	11⅜
do. pfd.	—	34	34⅜	20¾

Names in the News

BERT S. TAYLOR, of the B. F. Goodrich Company, will give a talk on "The Chemist in the Plant" as a part of the educational division work of the Thirteenth Exposition of Chemical Industries at Grand Central Palace, New York City. He will speak during the industrial chemistry course on the morning of May 8.

GEORGE HANDY, of the Goodyear Tire & Rubber Company, presided over a dinner meeting held by the Akron Alumni Association of Sigma Alpha Epsilon at the University Club in Akron on March 25. The occasion of the meeting was the 75th anniversary of the founding of the fraternity.

W. J. BOULBOULLE, manager of the office standards department of the B. F. Goodrich Company, has been named operations manager of the St. Louis district, effective April 9. L. D. WRENTMORE, manager of the accounts payable department, will do special work in the office standards department and will himself be replaced by L. H. ROEMISCH of the cost department of the mechanical division.

H. E. SIMMONS, professor of chemistry at Akron University and secretary of the Rubber Division of the American Chemical Society, gave a talk on rubber before a meeting of the Tri-L Club at the Universalist Church, Ravenna, O., on March 20. In the course of his talk, Professor Simmons stated that the production of rubber from potatoes has been accomplished but will never be more than a novelty. He discussed the situation in the rubber industry and illustrated his talk with lantern slides and actual chemical experiments.

K. D. SMITH, manager of the tire department of the B. F. Goodrich Company, returned to Akron on March 27 from a two-month visit to Europe where he was studying tire manufacturing methods.

CHARLES J. STILLMAN, vice-president of the Goodyear Tire & Rubber Company, spoke on March 19 before the finance committee of the Ohio General Assembly on the necessity for reduction in state expenditures to relieve taxpayers.

WALTER LEES, chief pilot of the Packard Motor Car Company, and WESLEY L. SMITH, pilot and engineer for the National Air Transport Company, were visitors at the Akron factory of the B. F. Goodrich Company on March 19. Mr. Lees' visit was in connection with special tubing to be used by Packard in the development of its Diesel aircraft engine. Mr. Smith inspected the ice-removing apparatus recently developed by Goodrich.

BERNARD LICHTENBERG, vice-president of the Alexander Hamilton Institute, New York City, addressed the management group of the B. F. Goodrich Company at Akron March 19 on "Advertising, Business Methods and Economic Theories Applicable to Present Conditions." Mr. Lichtenberg recently completed his term as president of the Association of National Advertisers, of which P. J. KELLY, Goodrich advertising manager, is a vice-president.

HERBERT F. POEHLE, engineer in the development division of the United States Rubber Company tire department at Detroit, Mich., has just been appointed a second lieutenant in the Quartermaster's Reserve Corps, Detroit Procurement District.

EDWIN B. HOPKINSON, director of footwear, sole and heel, and clothing sales for the United States Rubber Export Company, will return to New York City in a few days from an extended business trip through Latin America. He sailed from New York on January 9 and visited Brazil, Uruguay, Argentina and Cuba.

C. BLAKE MCDOWELL, Akron attorney, has purchased the publication, *Akron Topics*, which had formerly been under the control of CONGRESSMAN FRANCIS SEIBERLING, director of the Goodyear Tire & Rubber Company; E. J. SMAIL, JR., vice-president of the Rubber Service Laboratories Company; and W. W. MCINTOSH.

T. E. SALT, general sales manager of the Pharis Tire & Rubber Company, and C. W. LEKNER, general purchasing manager, directed a tour of inspection of the plant at Newark, O., on March 21 by 25 members of the sales force of Tracey Wells, Columbus, O. They were assisted by RALPH REEL, chief chemist, and other members of the factory staff.

JOHN W. LIVINGSTON, manager of the St. Louis works of the Monsanto Chemical Works, was elected vice-president of the company at the annual directors' meeting on March 24. DR. L. P. KYRIDES was elected vice-president in charge of research.

C. A. OSTBY, plant engineer of the Lycoming Rubber Company, Williamsport, Pa., made a radio talk last month on "Hand, Leg and Foot Protection" in connection with the March safety drive sponsored by the Pennsylvania Department of Labor and Industry.

F. ROBERT LEE, vice-president of the Thermoid Company, Trenton, N. J., is at present on an extended business trip through Europe.

J. J. SOTOMAYOR, export sales manager of the Mohawk Rubber Company, sailed last month for Europe to visit distributors in eleven countries on the continent as well as in Spanish Morocco and the Canary Islands. He expects to be away about three months.

WILLIAM STEPHENS, general superintendent of the Goodyear Tire & Rubber Company, was presented a bronze plaque last month in commemoration of his 30 years of service with the company. Mr. Stephens, a native of Akron, joined Goodyear when the company was less than three years old and had only 200 employes. He became a supervisor in the tube room and steadily rose to foreman and general foreman, and at 30 was made general superintendent of the plant.

F. W. KUHLKE, formerly of Akron, sailed recently for Johannesburg, South Africa, where he will assist C. A. WHOWELL in managing and directing the new direct factory branch organization being established throughout the Union by the Firestone Tire & Rubber Export Company. Mr. Kuhlke stopped over in England for one week, where he inspected the Firestone factory at Brentford, near London.

ALMAR H. SHATFORD, of the firm of Jno. F. Clark & Company, New York City, has been admitted to privileges of membership in the Rubber Exchange of New York.

WALLACE E. CAKE has been appointed director of the research division of the United States Rubber Plantations to fill the vacancy caused by the resignation of JAMES GRANTHAM. Mr. Grantham is continuing to act as a consultant to the plantations, however, and will make periodic trips to Sumatra from his home at Oxford, England.

GEORGE H. SEYBOLD has been appointed head manager of H. A. P. M., the largest estate operated in Sumatra by the United States Rubber Plantations, Ltd. He succeeds GODFREY E. COOMBS, who left the East last September because of ill health and has not shown sufficient recovery to permit his return to the tropics.

P. W. LITCHFIELD, president of the Goodyear Tire & Rubber Company, has been named by the United States Chamber of Commerce as a member of a committee of 14 business leaders to survey possibilities of averting drops in business and unemployment on a long-term basis.

J. R. HOOVER, manager of the general chemical laboratories of the B. F. Goodrich Company, spoke on research in the rubber industry before a meeting of the Tiffin Rotary Club at Tiffin, O., on March 25.

F. M. HARPHAM, vice-president of the Goodyear Tire & Rubber Company, spoke on March 30 before 50 members of the Men's Club of Christ Episcopal Church at Kent, O. He gave a graphic description of his flight around the world on the Graf Zeppelin.

Rubber News Around the World

William Duncan

William Duncan, chairman of the Rubber Growers' Association in 1928 and associated with the rubber planting industry for 30 years, died in England last month at 59 years of age. Beginning his career as a sugar planter, Mr. Duncan was present in Malaya when rubber planting was first undertaken and became an authority on all

phases of the plantation industry. He was for 12 years general manager of the Straits Rubber Company, Ltd., and Allied Companies, for two years chairman of the Planters' Association of Malaya, and a member of the Federal Council of the Federated Malay States. He actively advocated restriction in 1920 and 1921 and assisted in large measure in the establishment of the Rubber Research Institute. Upon retiring from the East, he became a director of several rubber companies and was elected to the Council of the Rubber Growers' Association in 1921 and named chairman in 1928.

JUGOSLAVIA PROHIBITS USING OF SOLID TIRES

The use of solid automobile tires has been prohibited in Jugoslavia since January 1, 1931, according to advices received in the Commerce Department from its Belgrade office. Only pneumatic and cushion (hollow center) may be used. Explanation of the regulation reads as follows:

(1) The expression "cushion" tire as stated in Article 30 of the regulation covering the protection of public highways, should be understood as applicable to such tires only as are manufactured with a longitudinal air channel (or canal) which is on the band.

(2) All other kinds of cushion tires having an air channel (or canal) in the center of the cross section, or with intermittent air pockets, may be used only up to December 31, 1932, and within the year 1931 the Ministry of Public Works will issue a decision as to which type of these tires are to be used after 1932.

February Golf Ball Imports

Imports of golf balls into the United States during February numbered 65,414, valued at $19,984. This compares with imports of 9,213 balls, valued at $2,556, in January, and with imports of 158,500 balls, worth $53,411, in February, 1930. The February, 1931, imports had a unit value of 30.6 cents per ball as against 24.4 cents in January and 32.9 cents in December, 1930.

New German Sponge

The I. G. Farbenindustrie, A. G., Frankfort on the Main, Germany, is now producing an artificial sponge for the market under the name of Agfa-Viscose, which will compete with natural and rubber sponges. The raw material is provided by reclaimed cellulose, obtained largely from used cinematographic film.

GREENGATE & IRWELL EARNED $402,000 IN 1930

The Greengate & Irwell Rubber Company, Ltd., has reported for the year ended December 24, 1930, a net profit of £82,622, or approximately $402,000, as compared to £101,183 in 1929. With £23,252 brought forward, the amount available is £105,874 as against £123,689 at the end of the previous year.

The directors have proposed a final ordinary dividend at the rate of 18¾ per cent per annum, making 15⅝ per cent for the year, or the same as for the year previous. After this distribution of £28,125 and allotting £7,000 to reserves, the balance carried forward was £23,874. There will be no dividend on the deferred shares, against 25 per cent, or 3d per share, in 1929.

Canadian Rubber Goods Trade Declined 21.4 Per Cent in 1930

THE world-wide economic depression, more acute competition in international trade and slightly lower export prices, contributed to a reduced Canadian rubber goods trade, according to the Commerce Department's Rubber Division.

Exports of rubber products from Canada in 1930 were valued at $25,242,375—a decline of 21.4 per cent from the high record of 1929, $32,095,695. The decline in the total value of Canadian exports was the result of a lower volume of business—particularly in tires and rubber footwear—rather than the result of lower prices. Tire exports as a whole declined in value from $18,820,357 in 1929 to $14,011,612 in 1930, or by 26 per cent.

The rapid increase in Canadian production and exportation of rubber goods in recent years made it seem likely, at the end of 1929, that in 1930 Canada would rank second only to the United States in total value of such exports. Transfer of tire export business from Canadian to British subsidiary manufacturing plants by some United States manufacturers resulted, however, in strengthening the hold of the United Kingdom on second place in the total trade.

The 1930 exports of pneumatic casings for motor cars numbered 1,376,048, against 1,746,950 in 1929—a decline of 21 per cent. The average unit value per casing dropped only slightly, from $9.38 to $9.29. The number of solid tires exported declined from 6,166 to 996, and the average value from $27 each to $22. Inner tubes suffered a 30 per cent decline in value of total exports, from $2,255,370 in 1929 to $1,578,879 in 1930, the average value per tube declining from $1.37 to $1.31.

New Zealand, which has been the outstanding Canadian market for automobile casings for a number of years, was relegated to second place in 1930, partly because the New Zealand tire trade was overstocked at the end of 1929 and suffered a severe depression during 1930, and partly because some American manufacturers supplied the market from British instead of Canadian factories. This afforded Argentina an opportunity to attain first place, but with a volume decline of 15 per cent as compared with 1929. Whether Argentina will be able to maintain its leading position throughout 1931 is problematical, owing to the recent production of tires there by one important manufacturer and the contemplated production by another within a few months.

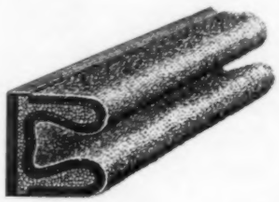
Canadian producers were able to increase their exports to Denmark by 49 per cent, cutting into the United States trade in that market. As a result of this gain, Canada is now the principal supplier to Denmark. The Union of South Africa was in fourth place, but with a decrease of 26 per cent from the 1929 volume. The drop in this market was caused by the economic depression. Other markets took less than 100,000 units each. Brazil came near to the latter mark with 95,805, but with a 32.5 per cent decline as compared with 1929. Canada was able to supplant the United States as the leading supplier to this market in 1930.

Canadian exports of rubber boots and shoes declined by 22.6 per cent in value in 1930, and those of canvas rubber-soled shoes by 30 per cent, in spite of higher exports to the United Kingdom and the higher unit values. The average value per pair of boots and shoes exported increased from $1.53 to $1.59, and of canvas rubber-soled shoes from 66.7 cents to 70.2 cents.

Rubber Goods and Specialties

Rubber Window Channel

The Felt Products Manufacturing Company, 1508 Carroll Avenue, Chicago, Ill., has introduced a new felt-covered sponge rubber channel for automobile windows. It is claimed that the high resiliency and the compressibility of the sponge rubber core causes the channel jaws to grip the glass

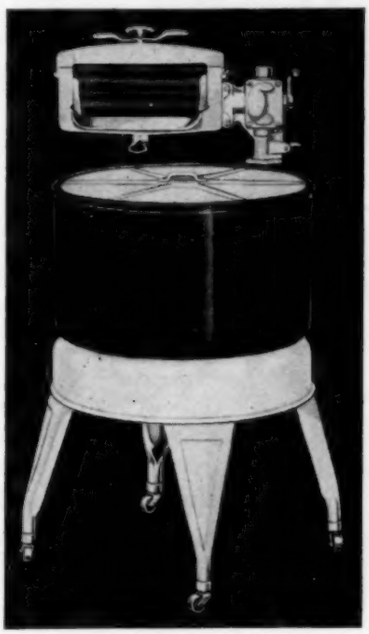


firmly without binding. A thin strip of solid rubber along the bottom edge is provided for stiffness. The glass slides easily on the thin covering of felt without squeaking. This channel, which is absolutely wind and rain proof, is offered in three lengths—28, 36 and 56 inches.

Cambridge Spotlite Shoe

As a result of several years of research work to build a shoe with the proper support for the foot in hard play, the Cambridge Rubber Company, Cambridge, Mass., has added the Spotlite basketball shoe to its line of Sneex. The Sneex arch lift and the ankle strap are its chief features, eliminating the figure eight adhesive tape which most trainers apply to the foot of the player. The ankle support strap itself holds the foot ab-

solutely firm in the shoe, removing any possibility for the foot slipping, thus preventing chafing and blisters. The sole has an inlay of tread stock at the point of greatest wear, and the toe cap is ventilated to lessen the chance of the foot heating up. There is a rubber sponge arch and heel support.



Challenger Washing Machine

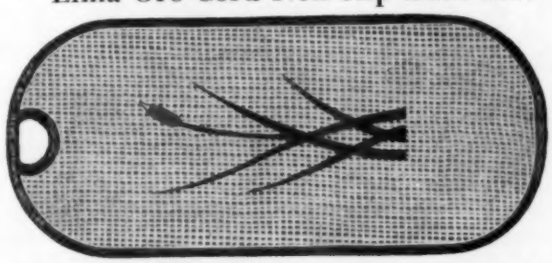
Special rubber mountings and a steel motor support reduce noise to a minimum in the operation of the new Model 31 Challenger electric washer, just introduced by the Automatic Washer Company, 2200 West Third Street, Newton, Ia. The rubber rolls of the new trough-design wringer are of the large 2¼-inch balloon type. The The machine itself is of the conventional bottom drive agitator type, with three-vane cast aluminum agitator operated by a worm and segment gear drive. The manufacturers claim that in using a segment and pinion made of laminated steel parts, together with the Westinghouse rubber-mounted motor, the machine has been made unusually quiet in running. The tub support and the wringer post supports are heavily insulated. The tub is of glistening porcelain over Armco ingot iron, rich black outside and mottled green inside.

Cossack Bathing Cap

Made entirely of the softest and most pliable sponge rubber, this Cossack design bathing cap stretches easily with full comeback and fits snugly. Like the all-sponge beret design caps of the same manufacturer, the Faultless Rubber Company, Ashland, O.,

they are a decided improvement over the regular fabric, worsted or felt caps for out-of-doors wear, especially in rainy weather. This model has the high crown Cossack cap effect, an unusual note in bathing caps, and is finished with a substantial sponge headband. It is made in five colors—red, blue, green, orchid and black—with headband color contrasting to body of cap.

Lima Gro-Cord Non-Slip Bath Mat



RECOGNIZING the fact that bathtub accidents exceed all other clasess of mishaps in the home, the Lima Cord Sole & Heel Company, Lima, O., has introduced its Gro-Cord Non-Slip bath mats for use both on the floor of the bathroom and in the tub itself. These mats are of the special cord construction which the company features in its soles and sink mats and are particularly effective because the cords swell slightly, affording a grip which plain rubber does not. The tub mat has a hole to slip over the bathtub drain hole. Both mats are made in either floral or plain designs and in green, blue, cream or black to harmonize with bathroom decorations. They are easily cleansed by soaping and rinsing.

Current Crude Rubber Items

Better Balance Is Predicted For Rubber Output and Use

UNDER present conditions world consumption of crude rubber during 1931 is placed at a maximum of 730,000 tons and production at a maximum of 735,000 tons by Clifford C. Johnston, of the Johnston Rubber Company, New York City. Mr. Johnston in his forecast does not ignore the possibilities of restriction altering these figures in the event that the Maxwell Plan now under consideration is adopted.

While lower than several other estimates made this year, Mr. Johnston claims that his consumption figures are purposely placed at high totals for each consuming country. These predictions for 1931 consumption follow:

	Tons
United States	400,000
Canada	35,000
United Kingdom	75,000
France	60,000
Germany	50,000
Japan	35,000
Italy	20,000
Russia	20,000
Rest of world	35,000
Total	730,000

Expects 735,000-Ton Output

Production for the year is placed approximately as follows:

	Tons
Malaya—	
All plantations	210,000
Native gardens	185,000
Total	395,000
Ceylon—	
Plantations	50,000
Native gardens	20,000
Other British territory	25,000
Total British territory	490,000
Dutch East Indies—	
Plantations	135,000
Native gardens	80,000
Total	215,000
Other countries—	
Plantation	10,000
Native and wild	20,000
Total	30,000
Total world production	735,000

Mr. Johnston points out that of the 80,000-ton output possible from the Dutch East Indies native gardens this year, at least 50,000 tons would probably never leave the territory for export if the Maxwell plan were adopted, as the terms of the latter, calling for a 10 per cent tax on native rubber in the Dutch East Indies, would practically amount to an inhibition on such rubber.

The 10 per cent tax would apply with prices above 6d, but below 9d per pound, and the Dutch possibly would not find it practicable to market native rubber bearing this added cost.

It must be plain that under the proposed restriction measure calling for a 25 per cent cut in exports, the British plantations also will bear the brunt of curtailment as a comparison of their production with that in the Dutch East Indies and elsewhere will show, it was stated.

Still another disproportion shown, in addition to the excess plantation holdings of the British, is in the production of native growers in British territory and that of natives in the Dutch East Indies, 205,000 tons for Malaya and Ceylon alone, against 80,000 tons in the Dutch East Indies.

DEALERS' RUBBER STOCKS GAIN IN THE FAR EAST

Far Eastern dealers' stocks of rubber underwent a further slight increase during February, a cable to the Rubber Exchange reveals. Dealers' holdings at the end of February totaled 44,105 tons, compared with 43,698 tons at the end of January and 40,434 tons at the end of December.

The increase was accounted for by ribbed smoked sheets, as stocks of other grades declined.

Rubber Exchange Meeting

The board of governors of the Rubber Exchange of New York, Inc., has called a special meeting of the members for April 15 at 3.30 P. M. Certain proposed amendments and additions to the by-laws of the exchange will be discussed at that time.

EXCHANGE DIFFERENTIALS ARE FIXED FOR APRIL

The adjustment committee of the Rubber Exchange of New York on March 24 fixed the price differentials between the various grades of Hevea plantation rubber which shall prevail on all deliveries against the new "A" contracts for the month of April as follows: No. 2 crepe (thick or thin) at 20 points; No. 2 ribbed smoked sheets at 15 points; No. 3 ribbed smoked sheets at 30 point; No. 4 ribbed smoked sheets at 55 points; No. 5 ribbed smoked sheets at 80 points; limit of allowance on No. 2 crepe at 25 points; and allowance on rubber delivered in bales at 13 points.

On February 16 the adjustment committee fixed the price differentials for March against the old "A" contracts as follows: off quality first latex crepe at two-tenths of a cent a pound; good F. A. Q. ribbed smoked sheets at twenty-five one-hundredths of a cent a pound; and ordinary F. A. Q. ribbed smoked sheets at five-tenths of a cent a pound.

MARCH MALAYAN EXPORTS RECORD SHARP INCREASE

Malaya, chief rubber producing country, exported a total of 48,589 tons of crude rubber to all consuming nations during March, according to a cable to the Rubber Exchange of New York, Inc.

This figure exceeded all estimates, and compares with 41,951 tons during February, and with 47,078 tons exported during March, 1930.

Malayan shipments for the first quarter total 132,119 tons, compared with 148,212 tons during the first three months of last year.

Closing Prices on Rubber Exchange of New York, Inc.

FROM MARCH 18 TO APRIL 2, 1931

		Spot	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Sales
No. 1 Standard Contract of 10 Tons															
Mar.	18	7.82	7.75	7.85	7.93	8.01	8.10	8.20	8.30	8.40	8.50	8.60	8.70	——	68
	19	7.75	7.72	7.90	7.96	8.03	8.11	8.20	8.30	8.41	8.52	8.62	8.72	——	34
	20	7.62	7.64	7.74	7.81	7.88	7.95	8.05	8.14	8.23	8.32	8.43	8.53	——	32
	21	7.62	7.60	7.80	7.87	7.95	8.02	8.10	8.15	8.27	8.38	8.48	8.58	——	14
	23	7.62	7.60	7.75	7.83	7.92	7.99	8.07	8.18	8.29	8.40	8.50	8.60	——	22
	24	7.52	7.55	7.58	7.66	7.75	7.82	7.90	8.00	8.10	8.20	8.28	8.36	——	56
	25	7.12	7.10	7.32	7.39	7.47	7.54	7.61	7.70	7.80	7.90	8.00	8.10	——	165
	26	7.12	7.10	7.25	7.33	7.42	7.51	7.60	7.69	7.77	7.86	7.96	8.06	——	81
	27	7.00	6.97	7.12	7.21	7.31	7.40	7.50	7.59	7.67	7.75	7.83	7.90	——	81
	28	7.00	6.95	7.10	7.20	7.31	7.40	7.50	7.59	7.67	7.76	7.86	7.96	——	2
	30	7.06	7.00	7.10	7.20	7.30	7.39	7.48	7.58	7.67	7.77	7.87	7.97	——	26
	31	7.00	6.90	7.01	7.07	7.18	7.25	7.32	7.40	7.50	7.62	7.71	7.80	——	25
Apr.	1	6.82	6.70	6.79	6.87	6.95	7.06	7.18	7.27	7.36	7.44	7.53	7.61	7.70	92
	2	6.80	6.70	6.77	6.88	7.00	7.10	7.20	7.28	7.37	7.46	7.54	7.64	7.74	69
Old "A" Contract of 2½ Tons															
Mar.	18	——	7.70	7.80	7.90	8.00	8.10	8.20	8.30	8.30	8.40	8.55*	8.63*	——	72
	19	——	7.60	7.80	7.90	8.00	8.10	8.20	8.30	8.40	8.40	8.53*	8.63*	——	161
	20	——	7.50	7.60	7.70	7.80	7.90	8.00	8.10	8.20	8.30	8.43*	8.53*	——	82
	21	——	7.50	7.60	7.70	7.80	7.90	8.10	8.10	8.20	8.30	8.43*	8.53*	——	11
	23	——	7.50	7.60	7.70	7.80	7.90	8.00	8.10	8.20	8.30	8.45*	8.55*	——	9
	24	——	7.40	7.50	7.60	7.70	7.70	7.80	7.90	8.00	8.10	8.23*	8.33*	——	28
	25	——	7.00	7.20	7.30	7.40	7.40	7.50	7.60	7.70	7.80	7.93*	8.03*	——	199
	26	——	7.00	7.10	7.20	7.40	7.40	7.50	7.60	7.70	7.80	7.93*	8.03*	——	15
	27	——	6.90	7.00	7.10	7.20	7.30	7.40	7.50	7.60	7.70	7.79*	7.85*	——	238
	28	——	6.90	7.00	7.00	7.20	7.30	7.40	7.50	7.60	7.70	7.79*	7.85*	——	3
	30	——	7.00	7.00	7.10	7.20	7.30	7.40	7.50	7.60	7.60	7.80*	7.90*	——	18
	31	——	6.80	6.90	7.00	7.10	7.20	7.20	7.40	7.40	7.50	7.67*	7.76*	——	51
Apr.	1	——	6.60	6.70	6.80	6.90	7.00	7.10	7.20	7.30	7.50	7.48*	7.56*	7.65*	133
	2	——	6.60	6.70	6.80	6.90	7.00	7.20	7.20	7.30	7.40	7.49*	7.59*	7.69*	28

*New "A" Contract.

U. S. Radio Program

The Blackman Company, New York City, advertising agency, has added Gus Van to the Keds radio program of the United States Rubber Company. "Miniature Movies" will be the title of Van's new offering.

Colonial Beacon Oil Loss

The Colonial Beacon Oil Company, subsidiary of the Standard Oil Company of New Jersey in whose filling stations the distribution of Atlas tires was stared, has reported for the year of 1930 a net loss of $2,414,023. This compares with a net income in 1929 of $247,615 for the predecessor company, the Beacon Oil Company.

Firestone Safety Record

The second largest of the Firestone Tire & Rubber Company's factory units, Akron Plant No. 2, set an all-time safety record in February, coming through the month without any lost time from accidents. This record has never been approached by a large rubber factory, Firestone officials declared. For all Firestone Akron plants, accidents were reduced 63 per cent in February.

U. S. Accident Record

During the month of January, the accident experience throughout the plants of the United States Rubber Company was the best ever recorded. There were only 20 lost time accidents in the entire system, while 10 factories operated without a single lost accident and four other plants had but one in the course of the month.

Form New Tire Firm

The Consumers Tire & Products Company was incorporated in Ohio last month and, according to Akron newspaper reports, plans to enter the tire manufacturing field in that city in the near future. Alfred Howes, J. Lee Pickering and Frances Daly were the incorporators of the firm, which has been capitalized with 100 shares of no-par stock.

Kelly Wins Tax Suit

Through a decision of the Ohio Supreme Court on March 25, the Kelly-Springfield Tire Company will not be required to pay taxes on warehouses at Cleveland. The Cuyahoga County auditor had attempted to force the tire company to pay taxes on working funds maintained at the Ohio headquarters, but the Supreme Court overruled motions asking that action on an Appellate Court reversal be reviewed, this disposing of the case.

André J. Michelin

André Jules Michelin, French manufacturer, sportsman and philanthropist and founder with his brother of the international tire firm bearing his name, died at his home in Paris April 4 at the age of 78. A full obituary of M. Michelin will be published in the April 25 issue of THE RUBBER AGE.

Montauk-Coronado Now Airlastic

The Airlastic Rubber Company is the new name of the company formerly doing business as the Montauk-Coronado Rubber Company, according to Arnim R. Brandt, vice-president and general manager. This company manufactures only sponge rubber products and is located at 3012 Clybourn Avenue, Chicago, Ill.

Makes Keds Factory Record

A team of four workers at the Lycoming Rubber Company, Williamsport, Pa., a subsidiary of the United States Rubber Company, recently established the best record ever made by any group of operators at that plant. Between January 19 and February 14, a total of 20 working days, this team lasted 44,880 pairs of Keds, an average daily production of 2,288 pairs, and did not damage a single pair.

Fisk Rubber Cuts Salaries

The Fisk Rubber Company, Chicopee Falls, Mass., has reduced salaries of all executives and office employes approximately 10 per cent, effective March 1. Intimation was given, according to local newspaper reports, that the factory workers might share in the reduction. The company is now being operated by a stockholders' committee under a receivership and employs 1,700 persons. A substantial reduction in office personnel was effected some time ago by abandonment of its branch retail distribution system.

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LATE MARKET PRICES

RUBBER—COTTONS AND FABRICS—CHEMICALS

NEW YORK, APRIL 7, 1931

RUBBER

Crude

THOSE who believed that crude rubber prices had found their all-time bottom and could only move upward were surprised in the past fortnight by the newest collapse of the market for the commodity. From a price of 8⅜ cents a pound early last month, rubber steadily declined as it appeared that the restriction negotiations were going to be in vain. With the opening of April, it broke through the 7-cent level and closed on April 7 at 6¾ cents on the outside market and as low as 6.30 cents in sales on the Rubber Exchange of New York.

The London market closed the same day at the record low of 3¼d per pound, with traders in doubt as to whether the bottom had been reached. Singapore quotations touched the hitherto unknown price of 2 15/16d in the godown market.

American and English stocks of the commodity are at new peaks, and shipments from the East continue to exceed world consumption. Automobile tire inventories in this country are again increasing, as shown by late reports of the February 28 figures.

Prices quoted on the New York outside market at the close on April 7 follow:

Plantations—

Ribbed Smoked Sheets—			
Spot-Apr.	.06⅝	@	.06¾
May-June	.06¾	@	.07
July-Sept.	.07	@	.07¼
First Latex, crepe spot	.06¾	@	.06⅞
Amber Crepe, No. 2	.06½	@	.06¾
Amber Crepe, No. 3	.06½	@	.06¾
Amber Crepe, No. 4	.06⅜	@	.06⅝
Brown Crepe, Clean thin	.06½	@	.06⅝
Brown Crepe, specky	.06¼	@	.06½
Liquid Latex, per gal.	.75	@	.85

Paras—

Up-river, fine	.08¼	@	.08½
Up-river Medium	Nominal		
Up-river Coarse	.06	@	.07
Acre Bolivian, fine	.08½	@	.08⅝
Caucho Ball, Upper	.06	@	.07
Islands, fine	Nominal		

Centrals—

Central scrap	.06	@	—
Esmeraldas	.06	@	—

Balata—

Block, Colombia	Nominal		
Block, Ciudad	.31	@	.31½

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers			
Spot-Apr.		@	3¼d
May-June	3¼	@	3⅜d
July-Sept.	3⅜	@	3½d

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers			
Spot		@	2 15/16d

Scrap

In sympathy with the crude commodity, scrap rubber sought new low price levels during the past fortnight. Just as the turn for the better seemed likely to appear, the collapse in the crude rubber market threatens to take away any possibility of dealers making normal profits. Late price quotations for the different grades of rubber scrap follow:

(Prices to Consumer)

Auto tire peelings	ton	20.00	@	21.50
Mixed auto	ton	9.50	@	10.50
Bicycle tires	ton	7.00	@	8.00
Clean solid truck tires	ton	26.50	@	27.00
Boots and shoes	cwt.	1.10	@	1.20
Arctics, untrimmed	cwt.	.75	@	.80
Inner tubes, No. 1	lb.	.04¼	@	.04½
Inner tubes, No. 2, compounded	lb.	.02½	@	.02¼
Inner Tubes, Red	lb.	.01⅞	@	.02
Air Brake Hose	ton	9.00	@	10.00
Rubber Hose	ton	8.50	@	9.00

Reclaimed

Rubber reclaimers have received some increase in business during the past fortnight, but the new deflation of the crude rubber market is tending to affect orders adversely. The industry, however, is in good condition, stocks not being excessive, and should pick up strongly as soon as the rubber trade itself does. Prices for the various grades follow:

High Tensile

Super-Reclaim Black	lb.	.07¾	@	.08
High Tensile Red	lb.	.07¼	@	.07½

Shoe

Unwashed	lb.	.06	@	.06¼
Washed	lb.	.08	@	.08¼

Tube

No. 1 (Floating)	lb.	.08½	@	.08¾
No. 2 (Compounded)	lb.	.07½	@	.07¾

Tires

Black	lb.	.05¾	@	.06
Black, selected tires	lb.	.06	@	.06½
Dark Gray	lb.	.07	@	.07½
Light Gray	lb.	.07⅜	@	.08
White	lb.	.08¼	@	.08¾
Truck, Heavy Gravity	lb.	.06	@	.06¼
Truck, Light Gravity	lb.	.06¼	@	.06½

Miscellaneous

Mechanical blends	lb.	.05	@	.05½

COTTON and FABRICS

Cotton

DURING the month of March, the average of the daily closing prices for spot middling upland cotton was 10.90 cents a pound. This was practically the same as the February average of 10.96 cents and compares with the March, 1930, figure of 15.13 cents.

The trend of prices during the past fortnight was downward, with the close nearly 70 points under that of March 18. Disappointment expressed by Farm Board officials with regard to the disinclination of producers to reduce acreage has had some effect on the market, as have the course of the securities market and general business conditions.

The high, low and closing prices for the commodity on the New York Cotton Exchange on April 7 were as follows:

	High	Low	Close Apr. 7	Close Mar. 18
May	10.45	10.32	10.32	10.99
July	10.70	10.55	10.55	11.24
Aug.	10.70	10.70	10.62	——

Tire Fabrics

During the month of February, the tire industry used 15,002,701 pounds of cotton fabric as compared to 15,923,084 pounds in January, despite the slightly higher tire output. Late price quotations for the various grades of tire fabric were as follows:

CORD

Peeler, carded, 23/4/3	lb.	.34½	@	.34¾
Peeler, carded, 23/5/3	lb.	.33	@	.33¼
Peeler, carded, 13/3/3	lb.	.30½	@	.30¾
Peeler, carded, 15/3/3	lb.	.31	@	.31¼
Egyptian, carded, 23/5/3	lb.	.43	@	.43½
Egyptian, combed, 23/5/3	lb.	.47	@	.47½

CHAFERS

Carded, American, 8 oz.	lb.	.26½	@	.27
Carded, American, 10 oz.	lb.	.26	@	.26½
Carded, American, 12 oz.	lb.	.25½	@	.26¼
Carded, American, 14 oz.	lb.	.25	@	.26

LENO BREAKER

Carded, American, 8¼ oz.	lb.	.26	@	.32
Carded, American, 10¼ oz.	lb.	.26	@	.32

SQUARE WOVEN

Carded, American, 17¼ oz. 23-11 ply	lb.	.33	@	.33½
Carded, American, 17¼ oz. 10-ply	lb.	.25	@	.25½

Sheetings

Prices on most sizes of sheetings showed fractional declines at the end of the past fortnight. The latest quotations on the most widely used sizes were as follows:

40-inch, 2.50-yard	yd.	.07⅝	@	.07½
40-inch, 2.85-yard	yd.	.06¾	@	.07⅛
40-inch, 3.15-yard	yd.	—	@	.07⅝
40-inch, 3.60-yard	yd.	—	@	.06⅝
40-inch, 3.75-yard	yd.	—	@	.05⅞
40-inch, 4.25-yard	yd.	—	@	.04⅞

Ducks

The market for cotton ducks closed the fortnight with no changes in the price structure and with no great show of activity. The quotations for the different grades follow:

Belting and Hose	lb.	.24	@	.26
Enameling	lb.	.22	@	.22½
Single filling	lb.	.10	@	.10½
Double filling	lb.	.11	@	.11½

CHEMICALS

THERE has been little of interest to the rubber chemical trade during the past fortnight, although the new collapse in the price of crude rubber may have its effect in some increase in future consumption. Tire and rubber factories in this country are not running at very high production schedules at present, but the rate of output has appreciably increased over that of the close of 1930. The spring and summer months should see a steady rise in activity and, consequently, in the use of rubber chemicals.

ACCELERATORS

Organic			
A-1	lb.	.24 @	.27
A-5-10	lb.	.33 @	.36
A-7	lb.	.55 @	.59
A-11	lb.	.62 @	.66
A-16	lb.	.57 @	.61
A-19	lb.	.58 @	.62
A-20	lb.	.64 @	.68
A-32	lb.	.80 @	.95
Aldehyde ammonia, crystals	lb.	.65 @	.70
Aniline oil, drums, f.o.b. works	lb.	.14½@	.16
Captax	lb		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.42 @	.44½
Diphenylguanidine	lb.	.30 @	.32½
Ethylidene aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.37½@	.40
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.58½@	.61
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.37½@	.40
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.75 @	—
Pipsol	lb.	4.30 @	4.50
R & H 40	lb.	.40 @	.42½
R & H 50	lb.	.40 @	.42½
R & H 397	lb.	.75 @	.77½
R-2	lb.	1.95 @	2.15
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Tensilac, No. 39	lb.	.40 @	.42½
Tensilac, No. 41	lb.	.50 @	.52½
Thermio F	lb.	.50 @	.55
Thiocarbanilid, drums	lb.	.21 @	.23
TMTT	lb.	3.00 @	3.25
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.75 @	1.00
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.50 @	.60
Zimate	lb.		
Inorganic			
Lead, sublimed blue	lb.	.08¼@	—
Lead, white	lb.	.08½@	.08¾
Litharge, domestic	lb.	.07¾@	—
Magnesia, calcined, light	per 100 lb.	5.35 @	5.45
heavy	per 100 lb.	3.65 @	3.75

COLORS

Blacks (See Compounding Materials)			
Blues			
Prussian	lb.	.35 @	.36
Ultramarine	lb.	.06 @	.32
Browns			
Sienna, Italian	lb.	.05½@	.12½
Umber, Turkey	lb.	.04½@	.07
Greens			
Chrome, light	lb.	.30 @	.32
medium	lb.	.31 @	.33
dark	lb.	.34 @	.36
Chromium Oxide, bbl.	lb.	.34½@	.35½
Reds			
Antimony crimson, 15/17	lb.	.40 @	.44
sulfur, free	lb.	.56 @	.66
golden, 15/17 F.S.	lb.	.20 @	.25
Indian English	lb.	.08 @	.11
Domestic (Maroon)	lb.	.11 @	—
Oximony	lb.	.13¼@	—
Red oxide, pure	lb.	.10 @	.12
Smith's 444 Crimson f.o.b. Springfield	lb.	.08¾@	.10
Rub-Er-Red, f.o.b. Easton	lb.	.08¾@	—
Venetian red	lb.	.08 @	.06
Vermillion, quicksilver, English	lb.	1.75 @	1.80
Whites			
Lithopone, Akcolith	lb.	.05 3/5@	.06
Lithopone, Albalith	lb.	.05¼@	.05¾
Lithopone, Azolith	lb.	.05¼@	.05¾
Lithopone, Vanolith	lb.	.05¾@	—
Titanium oxide	lb.	.21 @	—
Titanox B, f.o.b. St. Louis,	lb.	.06½@	.07
Titanox C, f.o.b. St. Louis,	lb.	.07 @	.07½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06½@	.07
ZZ (leaded)	lb.	.06⅝@	.06⅞
Horsehead Brand:			
Special	lb.	.07 @	.07½
XX Green	lb.	.07 @	.07½
XX Red, lead free	lb.	.06½@	.07
Kadox, black label	lb.	.10⅜@	.10⅞
blue label	lb.	.09⅜@	.09⅞
red label	lb.	.08 @	.08½
St. Joe, black label	lb.	.06½@	.07
red label	lb.	.06½@	.07
Zinc Oxide—French Process			
Anaconda, lead free	lb.	.06½@	.07
Anaconda, selected lead free	lb.	.07 @	.07½
White seal	lb.	.11⅝@	.11⅞
Green seal	lb.	.10⅝@	.10⅞
Red seal	lb.	.09⅝@	.09⅞
Yellows			
Chrume	lb.	.16½@	.17
Ocher, French medium	lb.	.02 @	.03
domestic	lb.	.01⅝@	.02

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85 @	24.50
Ammonia carbonate, lump	lb.	.07½@	.07¾
Asbestine	ton	14.75 @	18.00
Barium carbonate	lb.	.03½@	.05
Barium Dust	lb.	.05 @	.06
Barytes southern off-color	ton	12.00 @	18.00
Western prime white	ton	23.00 @	—
imported	ton	27.00 @	36.00
Basofor	lb.	.04½@	—
Bentonite	lb.	.02 @	.03
Blacks			
Arrow "Aerofloted"	lb.	.03½@	.08½
Bone Black	lb.	.06 @	.12½
Carbon, compressed	lb.	.03 @	.07
Carbon, uncompressed	lb.	.03 @	.07
Disperso, f.o.b. Louisiana	lb.	.03½@	—
Disperso, f.o.b. Texas	lb.	.036 @	—
Drop Black	lb.	.06 @	.14
Fumonex	lb.	.03½@	.07½
Excello, compressed	lb.	.04 @	.08
Gastex, f.o.b. Texas	lb.	.03 @	.06
Lamp Black	lb.	.10 @	.40
Micronex	lb.	.03½@	.08½
Thermatomic-Thermax	lb.		
Flex	lb.		
P-33	lb.		
United carbon, fob Tex.	lb.	.03½@	.08½
Velvetex carbon	lb.	.03 @	.06
Blanc fixe dry f.o.b. works	ton	75.00 @	90.00
Carrara filler	lb.	.01¾@	.02
Catalpo (fact.)	lb.	.02 @	—
Clay, Kaolin, domestic	ton	8.00 @	9.00
Aerfloted, Suprex	ton	8.00 @	20.00
Colloidal	lb.	.05 @	.08
Congaree, c. l. f.o.b. mine	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Langford	ton		
Lexington	ton	10.00 @	22.00
Mineral Flour, c.l. f.o.b. mine	ton	20.00 @	23.00
Par	ton		
Tensulite		15.00 @	—
Glues, extra white	lb.	.25 @	.26
medium white	lb.	.22 @	.24
Magnesia, carbonate	lb.	.08¾@	.11
Mica, white water grnd.	lb.	.06 @	.08
Off color (biotite)	lb.	.05 @	.07
Rotten Stone (powdered)	lb.	.02 @	.05
Soapstone, powdered	ton	15.00 @	22.00
Starch, powdered	cwt.	— @	2.92
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	cwt.	— @	1.00
English cliffstone	cwt.	1.75 @	2.00
Quaker	ton		
Superfine	ton	10.00 @	12.00
Sussex	ton		
Witco	ton	20.00 @	—
Zinc Carbonate	lb.	.09½@	.10½
Zinc Stearate	lb.	.19 @	.22

MINERAL RUBBER

Genasco (factory)	ton	50.00 @	52.00
Granulated M. R.	ton		
Hard Hydrocarbon	ton		
Paradura	ton	62.50 @	65.00
Parmr, solid	ton	28.00 @	48.00
Pioneer. MR, solid	ton	40.00 @	42.00
Pioneer-granulated	ton	50.00 @	52.00
R & H Hydro-Carbon	ton	27.05 @	29.00
Robertson, MR, solid	ton	34.00 @	80.00
M.R. (gran)	ton	38.00 @	80.00

SOFTENERS

Acids			
Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulfuric, 66 degrees	cwt.	1.60 @	1.95
Tartaric, crystals	lb.	— @	.31½
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.13 @	.17
Stearic, double pressed	lb.	.17 @	.22
Alkalies			
Caustic soda, 76%	cwt.	2.90 @	—
Soda ash, 58% C.L.	cwt.	1.17½@	—
Oils			
Corn, refined, bbls.	lb.	.08¾@	.10½
Cottonseed, crude		.06¾@	.07
Cycline	gal.	.27 @	.34
Degras (c.l. 100 bbls.)	lb.	.03¾@	—
Less c.l. (10-25 bbls.)	lb.	.04 @	—
Lots less than 10 bbls.	lb.	.04¼@	.04½
Fluxrite	lb.	.05½@	.06½
Palm Lagos	lb.	.05½@	.06
Niger	lb.	.05 @	.05¼
Para-Flux	gal.	.17 @	—
Petrolatum, white	lb.	.08 @	.08½
Pigmentaroil	gal.	.18 @	.23
Pine, steam distilled	gal.	.65 @	.70
destructively distilled	gal.	.54 @	.55
Witco Palm Oil	lb.	.11 @	—
Witco Softener (f.o.b. wks.)	lb.	.02 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.06½@	.07½
coal tar	gal.	.05½@	.06
pine, 200 lb. gr. wt.	bbl.	7.00 @	—
Rosin, grade K, 280 lb.	bbl.	— @	6.50
Pigmentar	gal.	.18 @	.23
Tar Retort, 50 gal.	bbl.	13.50 @	15.00
Solvents			
Acetone, pure	lb.	.10 @	.10½
Alcohol, denatured, No. 1 bbls.	gal.	.40 @	.47
Benzol, 90%	gal.	.20 @	.21
Carbon, bisulphide	lb.	.05½@	.06¼
Carbon, tetrachloride	lb.	.06¼@	.07
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.30 @	.38
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	.45¼@	.46
wood	gal.	.37 @	.39
destructively distilled	gal.	.35 @	—
Waxes			
Beeswax, white	lb.	.34 @	.36
Carnauba	lb.	.26 @	.28
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.06½@	.07
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02½@	—
White crude scale 124/126	lb.	.02½@	—
Refined, 125/127	lb.	.03¾@	—
Refined, 128/130	lb.	.03¾@	—
Refined, 135/137	lb.	.05¼@	—
Refined, 138/140	lb.	.07¼@	—

ANTI-OXIDANTS

Agerite, Resin	lb.		
Powder	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Neozone	lb.		
Oxynone	lb.	.68 @	.80
Resistox	lb.	.54 @	.57
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.66

SPECIALTIES

Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.30
Tonox	lb.	.56 @	.60

SUBSTITUTES

Black	lb.	.08 @	.14
White	lb.	.10 @	.16
Brown	lb.	.08 @	.15

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.03½@	.04½
Sulfur flour, Ref'n'd, 100% pure (bags)	cwt.	2.40 @	2.75
Commercial (bags	cwt.	1.75 @	2.10
Vandex	lb.		

TIRES & TUBES
CRUDE RUBBER

STATISTICAL SECTION

AUTOMOBILES
GASOLINE

MARCH exports of 48,589 long tons of crude rubber from Malaya were considered exceptionally high in comparison with shipments of from 41,000 to 42,000 long tons a month for November, December, January and February. April exports are expected to approximate 42,000 long tons, an appreciable reduction from the March total, but nevertheless higher than the producing would like to see at this time.

Warehouse stocks at London and Liverpool again rose to a new peak as of April 4 at 133,841 long tons. This compares with the figure of 130,106 long tons recorded on March 14. It is probable that American stocks on March 31 also set a new high record, as consumption during the month was not believed equal to net imports.

Automobile production is on the uptrend, and one manufacturer has sold more cars to date than during the entire year of 1930. Tire shipments should receive a boost in original equipment sales and, if the spring replacement demand materializes, should within the next few months be running in excess of the 1930 totals.

Latest figures covering imports and exports from the leading producing and consuming countries have been added to the appropriate tables in this section.

PLAN OF THE SECTION

The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available.

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U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
1921	185,394	73,772,677	17.76	5,716	2,414,924	18.86	179,678
1922	301,076	101,845,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,781	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1928:							
July	31,258	14,144,765	20.20	3,087	1,451,446	20.99	28,171
Aug.	31,204	12,860,150	18.39	2,377	1,084,646	20.37	28,827
Sept.	39,235	16,512,019	18.50	3,038	1,384,148	20.34	36,797
Oct.	44,058	18,200,332	18.44	2,405	1,085,407	20.15	41,653
Nov.	36,519	14,878,441	18.19	2,788	1,207,089	18.52	33,731
Dec.	43,511	17,580,966	18.04	2,738	1,165,743	19.00	40,773
1929:							
Jan.	57,564	22,872,943	17.74	3,663	1,778,401	21.61	53,901
Feb.	64,265	24,760,111	17.20	2,955	1,374,783	20.77	61,310
Mar.	50,604	20,380,905	17.98	4,218	2,094,037	22.16	46,386
Apr.	55,725	25,542,726	20.46	3,293	1,624,237	22.02	52,432
May	51,161	24,355,511	21.25	2,386	1,349,690	21.24	48,325
June	41,663	18,799,307	20.14	3,152	1,470,746	20.83	38,511
July	43,944	19,342,147	19.65	3,424	1,590,411	20.73	40,520
Aug.	37,222	16,530,090	19.83	2,644	1,232,217	20.80	34,578
Sept.	34,472	15,214,485	19.70	2,011	861,068	19.11	32,461
Oct.	38,163	16,192,261	18.94	2,614	1,190,510	20.33	35,549
Nov.	43,507	18,189,305	18.66	2,929	1,300,354	19.82	40,578
Dec.	42,952	17,573,330	18.27	2,745	1,007,279	16.38	40,207
1930:							
Jan.	47,496	17,793,563	16.72	3,144	1,077,415	15.30	44,352
Feb.	42,687	14,798,240	15.48	2,280	960,790	18.80	40,407
Mar.	44,976	14,653,243	14.54	3,187	1,192,708	16.71	41,789
Apr.	45,423	14,783,605	14.53	2,688	892,532	14.82	42,735
May	42,692	13,373,232	13.98	3,154	1,085,432	15.37	39,538
June	29,993	12,215,848	13.79	3,174	1,028,653	14.47	36,819
July	35,182	10,553,944	13.39	2,807	759,260	12.08	32,375
Aug.	35,713	9,666,362	12.08	2,357	655,773	12.42	33,356
Sept.	35,380	8,460,812	10.68	1,514	430,772	12.70	33,866
Oct.	46,069	9,893,980	9.59	2,432	419,325	7.70	43,637
Nov.	29,401	5,700,086	8.66	1,300	271,348	9.32	28,101
Dec.	37,300	7,175,242	8.59	2,168	542,197	11.17	35,132
1931:							
Jan.	36,307	7,190,591	8.84	1,706	350,480	9.17	34,601
Feb.	34,005	6,564,969	8.62	1,799	357,078	8.86	32,206
Mar.							
Apr.							
May							
June							

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1924	1925	1926	1927	1928	1929	1930	1931
Jan.	29,058	29,638	32,196	31,518	34,403	43,002	35,872	28,557
Feb.	25,736	29,761	31,136	30,137	33,702	41,594	32,014	28,797
Mar.	28,385	33,498	32,936	36,141	35,688	44,730	35,134	.....
Apr.	27,129	34,139	32,696	35,871	32,772	47,521	39,333	.....
May	25,845	35,322	29,364	34,592	37,333	49,233	39,035	.....
June	22,753	35,822	28,598	33,801	37,676	43,227	33,890	.....
July	23,396	36,053	27,577	29,219	37,407	41,526	29,245	.....
Aug.	28,982	35,909	34,533	33,460	42,927	38,274	30,575	.....
Sept.	31,497	31,691	32,904	27,214	39,882	34,707	25,288	.....
Oct.	31,520	29,047	29,836	26,790	40,857	34,800	27,271	.....
Nov.	27,289	28,253	28,080	26,792	37,461	27,659	23,479	.....
Dec.	27,199	28,748	26,293	25,492	31,232	23,531	21,493	.....
Totals	328,769	388,481	366,149	371,027	441,340	469,804	372,628	

Figures on Quarterly Basis

Quarter	1923	1924	1925	1926	1927	1928	1929	1930
Jan./Mar.	96,776	87,609	95,263	94,301	99,216	103,558	128,565	101,616
Apr./June	89,493	75,674	104,099	87,109	103,242	103,500	139,292	112,229
July/Sept.	55,621	83,813	99,493	93,793	89,210	117,573	113,746	85,261
Oct./Dec.	63,617	92,656	85,789	83,212	80,860	117,597	84,872	72,020
Totals	305,507	339,752	384,644	358,415	372,528	442,227	466,475	371,120

Note—The Rubber Association estimates its monthly rubber consumption figures to be 90 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

U. S. Consumption of Gasoline

(In Barrels of 42 Gallons)

MONTHS	1930	1931	MONTHS	1930	1931
January	25,731,000	26,844,000	July	38,256,000	
February	26,509,000		August	37,433,000	
March	31,029,000		September	37,823,000	
April	34,549,000		October	32,267,000	
May	36,497,000		November	30,984,000	
June	35,902,000		December	29,094,000	

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	3	4	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave
1928																														
December	17¾	—	17¾	17¾	17¾	18¼	18	18	18	18	18	18	18	18	18	18	18	18	18	20½	20½	20½	22	22	17½	17¾	17¾	18¾	18	18¼
1929																														
January	—	18¼	18¼	18¼	18¼	18¼	18½	18¾	20	20	—	20	19¾	20¾	20¾	20¾	20¾	—	20½	20½	22½	22¾	22	22	—	15¾	15¾	15¼	15¼	15¼
February	22¾	22	—	22¼	22¼	22¼	22¾	—	22¼	22¼	22½	25½	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	26½	26½	26½	26½	26¼	26¼	—	—	—	15¾
March	26	26	26	26	25¾	25¾	25½	25¾	25¾	25¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	23	22½	22½	—	—	—	15¾
April	23¼	23¼	22¾	22½	22¼	22¾	22½	22¾	22¾	22¾	21¾	21¾	21¾	21¾	21	22	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	21¼	21¼
May	19¾	19¾	19¾	20¼	20¼	20¼	21¾	21	21	21	21¾	21¾	22½	22¾	22¾	22¾	23½	23½	22¾	22¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¼	21½
June	21¾	21¾	21¾	21¾	21¾	21¾	21¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾
July	20¾	21¼	21	21¼	21¼	21¼	21	21¾	22	22	21¾	21¾	21¾	21¾	21	21	20¾	20¾	20¾	21¾	20	20	20¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
Aug.	21¾	21	21	21	21	21	22½	22	22	22	22	22	21	21	21	21	20	20	20	20	20	20	20	20	20	20	20	21¼	21¼	20¾
Sept.	21¾	21	21¼	21	21	21	21	21	21	21	21	21	21	21	21	21	20	20	20	20	20	20	20	20	20	20	20	20	20	20¾
Oct.	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
Nov.	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾
Dec.	—	16¾	16¾	16¾	16¾	16¾	—	16¾	16¾	16¾	16¾	16½	16¾	—	17	16¾	16¾	16½	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾
1930																														
January	16¾	—	16¾	16¾	15¾	15¾	15	14¾	14½	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼
February	15¼	—	15¼	15¼	15¾	15½	15¾	—	15¾	15¾	15¾	15¾	15½	15¾	16½	16½	16¾	16¾	16½	16½	16½	16	16	16	15¾	15¾	15¾	—	15¾	15¾
March	16¾	—	15¾	15¾	15¾	15¾	15¾	15¾	15	15	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¼	15¼	15	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¾	15¾
April	15¾	—	15¾	15¼	15¼	15¼	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15	—	13¾	13¾	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¾	15¾	15¾
May	14¾	—	14¾	14¼	14¼	14¼	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¼	14¼	13¾	13¾	14	14	14	14¼	14¼	14¼	14¼	14¼	14¼	14¾	15¾	15¾
June	13¾	—	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾
July	12¾	12	12¾	—	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
August	10¾	—	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾	10¾
September	9¾	9¾	9¾	9¾	9	8½	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾
October	7¾	8¼	8	8	7¾	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
November	8¾	8	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾
December	9½	9½	9¼	9¼	9¼	9¼	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½
1931																														
January	8¾	8¾	8¾	—	8½	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¼	—	8¾	8¾	8¾	8¾	8¾	8¾
February	7¾	7¾	7¾	7¾	7¾	7¾	—	7¾	7¾	7¾	7¾	7¾	7¾	7¾	7¾	7¾	7¾	7¾	7¾	7¾	—	7¾	7½	7¾	7¾	7¾	8	8	7¾	7¾
March	7¾	8	8¾	8¾	8¾	8¾	—	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	7¾	7¾	7¾	7	7	—	7¼	7¾
April	6¾	—	—	9¼	9¼	9¼	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1921

Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15
1911	141.30	1915	65.85	1919	48.70
1912	121.60	1916	72.50	1920	36.30
1913	82.04	1917	72.23	1921	16.86

Average Monthly Price per Pound Since 1922

Month	1922 Cents	1923 Cents	1924 Cents	1925 Cents	1926 Cents	1927 Cents	1928 Cents	1929 Cents	1930 Cents	1931 Cents
Jan.	18.82	32.73	25.86	36.71	79.50	38.75	40.25	20.14	15.24	8.34
Feb.	16.12	35.14	25.29	36.01	62.25	38.25	32.75	23.97	15.85	7.70
Mar.	14.53	34.21	22.83	41.00	59.00	41.04	26.82	24.55	15.34	7.71
Apr.	15.99	32.48	22.51	43.64	51.25	40.86	18.97	21.18	14.93	
May	15.25	27.39	18.89	58.47	47.75	40.76	18.99	21.46	14.24	
June	15.11	26.88	18.81	77.26	42.50	37.25	19.59	20.64	12.45	
July	14.67	26.10	22.16	103.16	41.03	34.87	19.40	21.30	11.24	
Aug.	13.93	28.84	26.17	82.99	38.50	35.12	19.46	20.59	9.96	
Sept.	14.44	28.95	27.56	88.88	41.00	33.67	18.47	20.37	8.28	
Oct.	19.78	26.93	31.13	98.01	42.50	34.32	18.83	19.67	8.20	
Nov.	23.88	27.14	34.33	104.80	38.50	37.58	18.26	16.62	9.01	
Dec.	27.42	26.60	37.88	98.51	38.25	40.63	17.97	16.12	9.05	
Average for Year	17.50	29.45	26.20	72.46	48.50	37.72	22.48	20.55	11.98	

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	Jan.	Feb.	Mar.	Apr.	Day	Jan.	Feb.	Mar.	Apr.
1	—	—	—	3¼	17	4⅛	3⅞	3⅞	—
2	—	3⅞	3⅞	3⅜	18	—	3¾	3⅞	—
3	4⅛	3⅞	4⅛	—	19	4⅛	3⅞	3⅞	—
4	—	3⅞	4⅛	—	20	4⅛	3¾	3¾	—
5	4⅛	3¾	4⅛	—	21	4⅛	3¾	3¾	—
6	4⅛	3⅞	4⅛	—	22	4⅛	—	—	—
7	4⅛	3⅞	4	—	23	4⅛	3¾	3¾	—
8	4⅛	—	—	—	24	4⅛	3⅝	3⅝	—
9	4⅛	3⅞	3⅞	—	25	—	3¾	3½	—
10	4¾	3⅞	3⅞	—	26	4⅛	3¾	3½	—
11	—	3⅞	4	—	27	4⅛	3⅞	3½	—
12	4¼	3⅞	4	—	28	4⅛	3⅞	3½	—
13	4¼	3⅞	4	—	29	4	—	—	—
14	4¼	3⅞	3⅞	—	30	4	—	3½	—
15	4¼	—	—	—	31	3⅞	—	3⅝	—
16	4¼	3⅞	3⅞	—					

Average Monthly Price Per Pound

Month	1929 Pence	1930 Pence	1931 Pence	Month	1929 Pence	1930 Pence	1931 Pence
Jan.	9.942	7.471	4.160	Aug.	10.505	4.880	
Feb.	11.875	7.948	3.823	Sept.	10.160	4.075	
Mar.	12.135	7.595	3.822	Oct.	9.620	4.023	
Apr.	10.490	7.391		Nov.	8.442	4.440	
May	10.717	6.926		Dec.	7.958	4.516	
June	10.580	6.195		Average for Year	10.291	5.926	
July	11.065	5.648					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	Mar.	Apr.	Day of Month	Mar.	Apr.	Day of Month	Mar.	Apr.
1	——	10.55	11	10.70	——	21	11.00	——
2	11.20	10.50	12	10.80	——	22	——	——
3	11.20	——	13	10.75	——	23	10.80	——
4	11.30	——	14	10.75	——	24	10.80	——
5	11.25	——	15	——	——	25	10.80	——
6	11.05	10.45	16	10.95	——	26	10.80	——
7	11.00	——	17	10.75	——	27	10.85	——
8	——	——	18	10.95	——	28	10.80	——
9	10.95	——	19	10.95	——	29	——	——
10	10.85	——	20	10.90	——	30	10.70	——
						31	10.70	——

Average Monthly Price Per Pound

Month	1929 Cents	1930 Cents	1931 Cents	Month	1929 Cents	1930 Cents	1931 Cents
Jan.	20.22	17.21	10.27	Aug.	18.62	12.03	
Feb.	20.21	15.62	10.96	Sept.	18.83	10.85	
Mar.	20.19	15.13	10.90	Oct.	18.46	10.63	
Apr.	20.29	16.39		Nov.	17.53	10.96	
May	19.41	16.43		Dec.	17.28	10.02	
June	18.74	14.48		Average for Year	19.03	13.57	
July	18.62	13.10					

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1929	ON HAND 1930	ON HAND 1931	AFLOAT 1929	AFLOAT 1930	AFLOAT 1931	ON HAND AND AFLOAT 1929	ON HAND AND AFLOAT 1930	ON HAND AND AFLOAT 1931
Jan.	76,342	126,068	209,487	93,330	65,483	56,187	169,672	191,551	265,674
Feb.	90,058	134,790	212,833	75,790	71,015	63,680	165,848	205,805	276,513
Mar.	100,536	141,843	.....	67,065	63,646	.....	167,601	205,489	.....
Apr.	107,659	148,272	.....	65,793	63,261	.....	173,457	211,533	.....
May	97,192	146,179	.....	65,793	68,168	.....	162,985	214,347	.....
June	92,061	151,435	.....	54,668	58,657	.....	146,729	210,142	.....
July	92,535	152,001	.....	46,145	58,326	.....	138,680	210,327	.....
Aug.	90,769	158,178	.....	49,423	61,168	.....	140,192	219,346	.....
Sept.	84,362	169,607	.....	58,758	60,923	.....	143,120	230,530	.....
Oct.	88,483	184,701	.....	59,180	51,122	.....	147,663	235,823	.....
Nov.	92,219	189,925	.....	62,358	52,538	.....	154,577	242,463	.....
Dec.	118,609	203,221	.....	62,388	56,035	.....	180,997	259,256	.....

(Rubber Manufacturers' Association figures raised to 100%)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1929	1930	1931	At end of	1929	1930	1931
Jan.	25,191	60,434	81,093	July	30,080	81,048	
Feb.	25,554	64,557		Aug.	35,605	80,931	
Mar.	28,214	68,923		Sept.	42,188	83,320	
Apr.	31,368	74,676		Oct.	47,803	77,647	
May	31,290	77,312		Nov.	52,454	76,887	
June	31,025	80,260		Dec.	54,304	78,013	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1930					
November	77,480	75,159	76,042	76,448	76,670
December	76,877	77,493	77,460	77,328	
1931					
January	78,042	78,761	79,261	80,194	81,039
February	81,183	81,432	82,111	82,185	
March	83,451	83,001	83,132	83,862	

Stocks in Liverpool

1930					
November	38,941	39,336	40,003	40,492	39,933
December	40,349	40,281	40,300	40,593	
1931					
January	41,516	41,814	42,270	42,171	43,463
February	43,293	43,679	44,555	44,776	
March	45,487	47,105	48,333	48,321	

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1929	1930	1931	End of	1929	1930	1931
Jan.	29,617	39,727	49,802	July	33,859	45,459	
Feb.	32,373	44,371	49,283	Aug.	30,834	48,132	
Mar.	29,437	45,657		Sept.	32,138	44,015	
Apr.	26,474	48,473		Oct.	33,770	39,930	
May	30,764	44,715		Nov.	30,963	41,674	
June	30,403	42,451		Dec.	35,548	45,963	

STOCKS IN OTHER CENTRES

1930 End of	Malaya Mainland	Afloat for Europe	Holland	Colombo	Para and Manaos
Apr.	29,758	23,580	2,204	4,000	4,482
May	26,482	22,730	2,308	4,000	4,388
June	26,578	20,920	2,316	3,856	4,588
July	28,311	27,290	2,312	4,500	4,665
Aug.	29,482	30,310	2,196	5,200	4,489
Sept.	30,863	31,000	2,343	5,834	4,854
Oct.	28,587	27,630	2,378	5,600	5,156
Nov.	40,551	24,220	2,405	5,400	4,535
Dec.	40,919	25,930	2,569	5,189	5,132
1931:					
Jan.	41,620	26,400	3,168		5,124
Feb.	43,027				5,404

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1923	23,140,620	0.6	1927	19,700,003	79.1
1924	21,863,311	19.7	1928	24,247,282	81.6
1925	26,001,664	66.8	1929	24,141,502	80.3
1926	24,199,524	78.3	1930	17,364,096	80.1
1930			1931		
July	1,449,161	80.7	January	681,301	67.9
August	1,504,187	78.1	February	1,010,774	73.9
September	1,052,109	80.2	March		
October	863,579	73.3	April		
November	920,435	72.2	May		
December	567,355	69.1	June		

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1923	1924	1925	1926	1927	1928	1929	1930
Production	45,259	51,633	60,845	61,237	64,439	77,944	68,726	50,965
Shipments	45,204	50,120	59,262	59,002	64,059	74,296	69,395	53,638
Inventory[2]	5,772	7,427	8,142	10,456	10,264	13,624	11,838	9,003

Figures for Recent Months

	PRODUCTION 1929	1930	1931	SHIPMENTS 1929	1930	1931	INVENTORY 1929	1930	1931
Jan.	6,301	4,485	3,675	6,211	4,406	3,744	12,855	11,924	8,957
Feb.	6,479	4,555		4,951	4,195		14,525	11,410	
Mar.	7,049	4,863		6,289	4,717		15,329	12,513	
Apr.	7,391	5,648		6,838	5,089		15,870	13,076	
May	7,636	3,717		6,735	5,216		16,733	13,432	
June	6,847	5,122		6,800	5,294		16,497	13,277	
July	6,320	3,991		7,364	5,447		15,034	11,812	
Aug.	5,693	4,166		7,354	5,175		13,337	10,848	
Sept.	4,460	3,365		5,623	4,405		12,070	9,812	
Oct.	4,611	3,582		4,649	3,499		12,042	9,803	
Nov.	3,378	2,654		3,355	2,834		12,127	9,595	
Dec.	3,057	2,814		3,237	3,361		11,838	9,003	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1923	1924	1925	1926	1927	1928	1929	1930
Production	60,116	70,706	82,614	76,618	70,823	80,180	68,829	52,420
Shipments	59,072	68,106	81,004	71,591	72,896	77,127	70,592	54,938
Inventory[2]	8,425	11,052	11,313	16,200	13,692	16,117	12,807	9,999

Figures for Recent Months

	PRODUCTION 1929	1930	1931	SHIPMENTS 1929	1930	1931	INVENTORY 1929	1930	1931
Jan.	6,109	4,607	3,623	6,789	4,857	4,062	14,424	12,704	9,439
Feb.	6,346	4,634		4,948	4,337		15,936	13,036	
Mar.	7,000	4,941		6,317	4,727		16,641	13,179	
Apr.	7,157	5,510		6,716	4,848		17,000	13,784	
May	7,181	5,535		6,598	5,074		17,745	13,852	
June	6,542	4,950		6,515	5,265		17,294	13,612	
July	5,793	3,939		7,605	5,855		15,311	11,657	
Aug.	5,481	4,796		7,672	5,762		13,072	10,737	
Sept.	5,190	3,817		5,859	4,541		12,585	10,065	
Oct.	5,000	3,951		4,689	3,472		12,802	10,517	
Nov.	3,544	2,680		3,480	2,788		12,845	10,313	
Dec.	3,484	3,060		3,404	3,412		12,807	9,999	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete beginning with 1929, and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1924	3,600,918	3,203,049	397,869	135,246	117,765	17,481	3,736,164
1925	4,265,704	3,760,459	505,245	161,389	139,311	22,078	4,427,093
1926	4,298,799	3,808,753	490,046	205,002	164,483	40,609	4,503,891
1927	3,393,887	2,938,868	453,019	179,426	146,850	32,556	3,573,313
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929							
July	500,331	427,213	73,118	17,461	13,600	3,861	517,792
Aug.	499,629	444,711	54,918	14,214	11,037	3,177	513,843
Sept.	415,332	365,651	49,681	13,817	10,710	3,107	429,149
Oct.	380,011	321,195	58,816	14,523	8,975	5,548	394,534
Nov.	217,570	170,928	46,642	9,424	7,137	2,287	226,994
Dec.	119,950	92,717	27,233	5,495	4,426	1,069	125,445
TOTAL	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930							
Jan.	273,089	235,099	37,990	10,388	8,856	1,532	283,477
Feb.	346,940	297,483	49,457	15,548	13,021	2,527	362,488
March	401,378	336,178	64,200	20,730	17,165	3,565	422,108
April	442,630	375,171	67,459	24,257	20,872	3,385	466,887
May	417,154	362,784	54,370	24,672	21,251	3,421	441,826
June	335,475	289,704	45,771	15,090	12,194	2,896	350,565
July	262,363	222,700	39,663	10,188	8,556	1,632	272,551
Aug.	224,368	187,288	35,758	9,792	6,946	2,846	234,160
Sept.	216,877	175,720	41,157	7,957	5,623	2,334	224,834
Oct.	150,044	112,800	37,244	4,541	3,206	1,335	154,585
Nov.	135,752	102,957	32,795	5,407	3,527	1,880	141,159
Dec.	155,701	124,173	31,528	5,622	4,225	1,397	161,323
Total	3,354,986	2,814,452	540,534	154,192	125,442	28,750	3,509,178
1931							
Jan.	171,851	140,267	31,584	6,496	4,552	1,944	178,347
Feb.	219,897	182,264	37,633	9,871	7,529	2,342	229,768
Mar.							
Apr.							
May							
June							

Exports of Crude Rubber from Principal Producing Countries

(Long Tons

	BRITISH MALAYA[1]							DUTCH EAST INDIES[1]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[5]	Siam[4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[3]	Amazon Valley	All Other[6]	World Total[7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,955
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	517,528
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,598	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1929:															
Feb.	47,926	12,103	35,823	7,064	1,117	955	600	495	6,572	7,511	10,384	807	2,104	520	73,952
Mar.	49,448	14,553	34,895	6,583	1,413	758	601	499	5,515	6,620	10,629	658	2,332	786	71,289
Apr.	49,816	11,414	38,402	5,097	727	747	548	306	5,997	6,645	11,321	673	1,950	569	72,982
May	43,960	15,593	28,367	5,723	800	966	548	453	6,264	6,961	13,437	1,059	1,922	733	67,233
June	40,398	14,344	26,054	5,563	1,122	1,061	547	422	5,582	6,693	11,270	757	1,398	548	61,017
July	46,454	15,071	31,383	5,457	974	1,247	641	462	6,422	7,192	13,995	575	1,457	543	70,348
Aug.	50,441	15,469	34,972	6,079	685	993	641	431	4,644	7,298	10,782	1,032	1,563	499	69,619
Sept.	53,484	12,392	41,092	7,993	884	882	640	406	4,708	7,517	10,149	655	1,566	504	76,446
Oct.	47,987	12,516	35,421	8,381	812	1,047	671	485	4,697	8,295	10,512	893	1,606	445	73,265
Nov.	46,279	11,204	35,075	6,660	1,065	668	672	278	4,760	6,711	9,380	771	1,442	535	68,017
Dec.	46,147	15,018	31,129	8,683	900	930	672	320	5,189	8,279	11,102	966	1,674	443	70,287
1930:															
Jan.	52,535	11,773	40,762	7,741	1,560	791	642	386	5,709	7,831	8,928	856	1,837	585	77,628
Feb.	48,947	12,960	35,987	8,055	1,245	847	642	469	6,900	7,191	11,414	944	1,787	480	75,961
Mar.	47,320	12,236	34,084	6,617	1,129	976	642	391	5,796	6,612	11,214	643	1,674	536	70,314
Apr.	43,803	14,627	29,176	4,444	856	1,026	502	366	4,802	6,326	12,724	433	1,201	630	62,486
May	49,016	13,253	35,763	5,968	975	917	502	350	6,352	6,661	12,041	753	1,383	555	72,220
June	36,607	12,120	24,487	4,577	778	1,040	201	392	4,728	4,776	9,512	425	974	551	52,441
July	41,347	12,759	28,588	3,868	792	1,087	600	327	6,022	5,891	9,770	648	810	418	58,821
Aug.	47,802	10,304	37,498	7,077	600	740	600	335	5,892	7,197	9,520	394	809	382	71,134
Sept.	48,529	8,087	40,442	7,966	343	680	600	289	5,960	6,358	7,302	527	1,093	474	72,034
Oct.	47,770	7,312	40,458	7,681	591	598	650	300	5,916	6,956	6,352	667	669	449	71,287
Nov.	41,281	7,774	33,507	6,042	864	631	600*	311	5,334	6,401	8,001	654	658	238	63,241
Dec.	42,086	9,671	32,415	6,934	1,049	976	600*	335	6,254	7,196	8,476	721	1,365	353	66,674
1931:															
Jan.	41,579	11,029	30,554	6,751	900*	770	600*	424	5,923	7,348	10,328	914	994	350*	65,856*
Feb.	41,951	9,672	32,279	6,345	900*	945	600*	409	4,869	7,206	9,001	900*	1,271	350*	65,075*

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, and 2,670 in 1929. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons 1926, about ½ ton in 1927, and 1 ton in 1928. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, and 1,302 tons in 1929. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands. This figure includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States[1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,128	62	1,815	3,840	5,510	2,292	2,008	567	371,399
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,480	2,493	2,643	172	—3,807	1,778	589	567	396,012
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,370	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,808
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,015
1929:															
Feb.	61,331	5,179	5,001	4,613	2,908	2,727	1,259	684	1,131	627	113	226	115	356	86,270
Mar.	46,391	9,068	4,409	4,586	4,961	2,630	1,515	716	725	931	816	354	80	409	77,091
Apr.	52,520	8,295	4,854	5,851	3,177	2,308	1,407	703	1,518	750	144	956	40	445	82,478
May	48,475	5,112	3,152	3,682	2,937	2,314	1,417	996	1,437	354	201	468	37	277	71,359
June	38,821	4,787	6,814	3,948	3,075	1,598	1,624	695	2,215	672	687	507	24	520	65,882
July	41,114	4,993	4,839	3,559	3,205	2,388	2,023	1,056	2,918	1,039	253	519	30	465	68,401
Aug.	35,397	14,594	4,645	4,082	2,879	3,663	908	1,234	724	902	254	429	25	319	70,055
Sept.	32,912	17,010	3,889	4,691	1,908	3,511	1,224	1,235	853	672	253	361	91	477	69,453
Oct.	36,040	16,111	4,489	3,855	1,821	3,902	1,838	1,073	1,125	1,147	278	710	91	201	72,181
Nov.	41,097	13,141	3,082	3,776	2,709	3,221	1,275	1,226	1,453	361	253	595	62	313	72,564
Dec.	40,588	12,434	4,274	2,921	2,114	2,251	1,198	1,200	726	741	52	677	90	443	69,709
1930:															
Jan.	44,911	11,106	4,207	3,862	2,842	2,805	910	826	332	612	209	552	200*	577	73,943
Feb.	40,792	10,293	4,482	3,697	2,250	1,386	1,385	2,705	457	1,143	188	315	200*	289	69,533
Mar.	42,216	12,346	4,354	4,289	3,776	2,663	1,083	1,153	975	678	358	322	200*	263	74,676
Apr.	43,036	13,058	5,006	4,488	2,303	2,769	2,067	929	673	1,431	158	461	200*	255	76,790
May	40,012	9,861	5,233	4,379	2,593	2,699	1,279	1,645	64	1,250	230	274	200*	282	65,626
June	37,374	9,645	4,458	3,794	2,579	2,677	1,378	1,574	67	691	343	507	200*	282	65,620
July	32,785	7,650	3,811	3,449	3,347	1,206	587	567	84	939	172	756	200*	342	55,395
Aug.	34,513	8,369	3,953	3,515	2,108	2,170	886	149	265	888	37	747	200*	450	58,256
Sept.	34,373	16,015	5,285	4,089	1,578	2,606	1,279	1,373	414	824	221	817	200*	411	69,484
Oct.	44,385	9,095	7,403	3,747	1,942	3,951	2,460	2,782	609	769	439	1,132	200*	351	79,264
Nov.	28,437	-250	13,662	3,074	2,128	4,003	2,510	2,140	464	596	364	1,180	200*	343	58,851
Dec.	35,202	12,249	7,149	3,105	1,347	4,104	2,815	544	950	814	205	647	200*	673	70,004
1931:															
Jan.	34,892			3,847	1,709	2,861	1,036	1,775	601				200*		
Feb.	32,575														

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]United States imports of guayule are included in this compilation. *Figure is provisional; final figure will be shown immediately it becomes available.

Domestic Production of Miscellaneous Rubber Goods

	Rubber Proofed Fabrics	Rubber Heels	Rubber Soles	Mechanical Goods Shipments
	Yards	Pairs	Pairs	Dollars
1924	25,020,000	186,279,000	(1)	$48,615,000
1925	23,988,000	206,970,000	16,211,620 (2)	64,877,000
1926	29,328,000	183,312,000	12,253,000	76,789,000
1927	37,872,000	201,014,000	27,160,000	68,625,000
1928	41,179,000	235,170,000	37,645,000	69,114,000
1929	50,731,000	282,126,000	34,499,000	74,770,000
1930	42,681,000	178,059,000	29,514,000	58,465,000
1930:				
January	3,281,000	15,470,000	3,496,000	5,169,000
February	3,441,000	14,172,000	2,338,000	5,376,000
March	3,570,000	15,439,000	2,582,000	5,981,000
April	4,029,000	17,762,000	2,593,000	5,989,000
May	3,597,000	15,603,000	1,939,000	6,163,000
June	3,379,000	15,795,000	2,734,000	5,318,000
July	2,940,000	15,117,000	2,663,000	4,910,000
August	3,458,000	13,735,000	1,473,000	4,552,000
September	3,046,000	14,322,000	2,193,000	4,083,000
October	5,209,000	16,460,000	3,056,000	4,186,000
November	2,822,000	11,083,000	1,426,000	3,460,000
December	1,909,000	13,101,000	3,021,000	3,338,000

(1) Not available; (2) Last 9 months only.

Source: "Survey of Current of Business of the Department of Commerce."

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All quantities in Long Tons)

	Guayule		Balata		Jelutong		Liquid Latex (1)	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
1919	1,430	760,690	727	937,038	8,332	2,213,964	——	——
1920	758	345,985	1,064	1,260,043	5,672	2,068,501	——	——
1921	58	26,945	814	1,077,859	1,745	351,893	——	——
1922	127	57,040	812	978,765	2,335	403,812	——	——
1923	1,155	542,227	700	898,524	4,565	853,308	——	——
1924	1,356	536,392	464	568,456	6,165	1,287,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	781	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1930:								
Mar.	148	50,007	16	12,498	522	128,844	279	107,847
Apr.	75	19,856	58	54,548	410	103,089	226	98,239
May	172	57,760	17	13,645	602	144,415	749	242,385
June	168	51,561	52	47,000	532	120,424	389	129,368
July	93	26,000	24	17,463	45	102,325	242	78,688
Aug.	50	14,000	11	5,600	766	168,511	944	253,127
Sept.	100	28,000	45	39,512	486	86,664	402	127,751
Oct.	64	18,527	36	30,702	490	113,638	306	99,637
Nov.	—	——	73	61,650	389	84,219	332	65,265
Dec.	—	——	90	66,198	429	116,644	70	20,481
1931:								
Jan.	—	——	46	31,870	355	58,897	291	70,708
Feb.	—	——	17	13,801	511	114,100	369	89,470

(1) Latex import figures not available before 1924.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

	Consumption					Consumption				
Year	Production	Tons	% to Crude	Stocks*	Year	Production	Tons	% to Crude	Stocks*
1921	36,725	41,351	24.1	.....	1926	180,582	164,500	45.9	23,218
1922	57,834	54,458	19.3	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....	1928	208,516	223,000	50.4	24,785
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1925	132,930	137,105	35.6	13,203	1930	146,808	155,673	39.6	24,008
1929:									
Jan.	18,685	21,068	49.1	24,394	July	18,387	20,236	48.7	19,679
Feb.	18,094	19,829	47.7	23,305	Aug.	19,787	18,230	47.6	22,309
Mar.	19,984	20,867	46.7	22,076	Sept.	18,660	17,071	49.2	24,984
Apr.	19,899	22,435	47.3	20,680	Oct.	18,865	18,744	53.8	25,117
May	20,385	23,176	47.1	19,479	Nov.	14,363	15,330	55.4	26,080
June	18,416	18,141	42.0	17,980	Dec.	13,429	11,531	49.0	27,464
1930:									
Jan.	15,010	17,454	47.6	24,241	July	12,322	12,384	42.3	23,873
Feb.	15,846	14,559	44.5	24,243	Aug.	12,047	10,985	35.9	22,980
Mar.	17,400	15,241	42.2	24,415	Sept.	11,433	10,480	41.4	21,996
Apr.	17,828	16,904	42.0	24,587	Oct.	12,349	10,724	39.3	21,145
May	17,812	17,052	42.7	23,356	Nov.	10,763	8,816	37.5	24,007
June	15,714	14,063	40.8	24,449	Dec.	10,073	8,449	39.3	24,008
1931:									
Jan.	10,349	10,728	37.6	22,429	July	.....	.....	.....	.....
Feb.	.....	.....	.....	.....	Aug.	.....	.....	.....	.....
Mar.	.....	.....	.....	.....	Sept.	.....	.....	.....	.....
Apr.	.....	.....	.....	.....	Oct.	.....	.....	.....	.....
May	.....	.....	.....	.....	Nov.	.....	.....	.....	.....
June	.....	.....	.....	.....	Dec.	.....	.....	.....	.....

*Stocks on hand at the end of month or year. Exports of reclaimed rubber, not shown in this table, amounted to 8,540 tons in 1927, 9,577 tons in 1928, and 12,369 tons in 1929.

(Rubber Manufacturers' Association figures raised to 100%)

REVIEW DESK

Books, New Publications, Catalogues, Etc.

COMPOUNDING MATERIALS USED IN THE RUBBER INDUSTRY. Published by the National Safety Council, 20 North Wacker Drive, Chicago, Ill. 1931. 16 pp. For free distribution.

The rubber industry uses several hundred varied compounds in its manufacturing processes, some of which are dangerous to the health of those handling them unless precautionary measures are taken. These chemicals, however, can all be handled in a safe manner provided their toxic and chemical properties are understood and efficient methods of handling are employed. It has been with the hope of stimulating more interest along these lines that this pamphlet on accelerators, anti-oxidants and dry organic compounds, the first of a series of four on rubber chemicals, has been prepared. A list of 107 organic accelerators and anti-oxidants covered by the Health Hazards Committee of the Rubber Section, National Safety Council, is presented alphabetically with information obtained both from manufacturers and from consumers and with each compound classified in one of four groups according to its toxicity. One may be permitted to disagree with the conclusion of the authors that the "tendency for some manufacturers of chemicals to place rubber accelerators and compounding ingredients upon the market under fancy trade names . . . is a practice to be discouraged." The development of such materials by reputable chemical manufacturers and the advertising and selling of them, to which the use of trade names is essential, should be the firmest assurance to the rubber industry of high standards and recognizable quality. It is notable that of the brand-name materials listed by the National Safety Council, practically all fall into the groups having only low or slight relative toxicity.

HEAT TRANSFER IN LABORATORY OVENS. Published by the Freas Thermo-Electric Company, 1206 South Grove Street, Irvington, N. J. 1931. 12 pp. For free distribution.

Essentially, a laboratory oven is an apparatus whose primary function is the transfer of heat from a heater coil to materials placed in the oven for treatment. A clear understanding of the principles of heat transfer and their application to laboratory ovens is of inestimable value when contemplating the purchase of equipment of this character, and it is the purpose of this booklet to explain these principles and to point out the type of heating system that will give superior results.

BROWN AUTOMATIC CONTROL. Published by the Brown Instrument Company, Wayne and Roberts Avenues, Philadelphia, Pa. 1931. 48 pp. For free distribution.

In a great number of processes the automatic control of factors such as temperature, pressure, liquid level and flow is invaluable. Instruments for use in providing such automatic control are described in this handsomely illustrated catalogue.

SOVIET FOREIGN TRADE: MENACE OR PROMISE. By J. M. Budish and Samuel S. Shipman. Published by Horace Liveright, Inc., 61 West 48th Street, New York City. 1931. 288 pp. $2.50.

The completion of the first two years of the Soviet Five Year Plan of economic development has brought the affairs of Russia, and more particularly its growing foreign trade, into the forefront of public attention. The status of workers in the Soviet Union and the possible effects of Soviet foreign trade are taken up in detail by the authors of this study, which was sponsored by the Economic Division of the Amtorg Trading Corporation, representative of the leading Soviet trade and industrial organizations in this country. The authors consider in detail the eleven principal items imported into the United States from Russia and conclude that Soviet-American trade should develop to a point far beyond that hitherto attained.

STANDARDS YEARBOOK, 1931. Published by the National Bureau of Standards, United States Department of Commerce, Washington, D. C. 1931. 405 pp. $1.00.

The more important activities of the Bureau of Standards in research and standardization are included in this annual publication. Among the investigations conducted during the year were those into the chemical nature of rubber, abrasion tests for rubber, antioxidants in rubber compounds, and the effect of humidity and temperature on the properties of rubber compounds.